

MINNESOTA MEDICINE

*Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association,
Northern Minnesota Medical Association, Minnesota Academy of Medicine, and
Minneapolis Surgical Society*

Owned and Published by
THE MINNESOTA STATE MEDICAL ASSOCIATION
Under the Direction of Its

EDITING AND PUBLISHING COMMITTEE

E. M. HAMMES, M.D., Chairman, St. Paul
T. A. PEPPARD, M.D., Secretary, Minneapolis
A. H. WELLS, M.D., Duluth
H. A. ROUST, M.D., Montevideo
C. L. OPPEGAARD, M.D., Crookston

PHILIP F. DONOHUE, M.D., St. Paul
HENRY L. ULRICH, M.D., Minneapolis
O. W. ROWE, M.D., Duluth
H. W. MEYERDING, M.D., Rochester
B. O. MORK, JR., M.D., Worthington

EDITOR
CARL B. DRAKE, M.D., St. Paul

ASSOCIATE EDITORS
GEORGE EARL, M.D., Saint Paul
HENRY L. ULRICH, M.D., Minneapolis

VOLUME 26

JANUARY TO DECEMBER, 1943

EDITORIAL AND BUSINESS OFFICES
2642 University Avenue - - - - - Saint Paul, Minn
BUSINESS MANAGER
J. R. BRUCE

P.G.

medical
FEB 1 1943

Medical Library

Minnesota MEDICINE

PUBLISHED MONTHLY BY THE MINNESOTA STATE MEDICAL ASSOCIATION



Twenty-fifth Anniversary
Number

JANUARY, 1943

Vol. 26 . . . No. 1

40c a copy—\$3.00 a year

Printed in U.S.A.

For Safety's Sake

Hospital Standards — Sterilization and Sanitation
Impartial Pathological Tests Made Monthly.

INSPECTION INVITED



THIS SEAL IS YOUR ASSURANCE OF PROTECTION.
USED ONLY BY SELECTED AND APPROVED DIAPER
SERVICES FROM COAST TO COAST.

The Only Diaper Service In The World Owned and
Operated By A Registered Nurse

Neva Montgomery, R.N.

BABY'S DIAPER SERVICE
DY-DEE WASH

2741 Hennepin Avenue

"Northwest's Finest Institute of Diaper Hygiene"

LOCUST 4288 — TELEPHONES — MIDWAY 4682

Minnesota Medicine

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society

Volume 26

January, 1943

No. 1

Contents

PROGRESS IN INTERNAL MEDICINE IN MINNESOTA. <i>E. L. Tuohy, B.A., M.D., F.A.C.P.</i> , Duluth, Minnesota	23	REMINISCENCES. <i>E. Sydney Boleyn, M.D.</i> , Stillwater, Minnesota	99	
CORONARY DISEASE. <i>Fredrick A. Willius, M.D.</i> , Rochester, Minnesota	33	GROUP HOSPITALIZATION. <i>Arthur M. Calvin</i> , Saint Paul, Minnesota	104	
NEUROPSYCHIATRY THEN AND NOW. <i>E. M. Hammes, M.D.</i> , Saint Paul, Minnesota	40	CLINICAL PATHOLOGICAL CONFERENCE: Presentation of a Case. <i>A. J. Hertzog, M.D.</i> , and <i>S. V. Lofness, M.D.</i>	106	
ENDOCRINOLOGY IN THE LAST QUARTER OF A CENTURY. <i>Max H. Hoffman, M.D.</i> , Saint Paul, Minnesota	43	HISTORY OF MEDICINE IN MINNESOTA: The Asiatic Cholera in Saint Paul (continued) <i>John M. Armstrong, M.D.</i> , Saint Paul, Minnesota	108	
PREVENTIVE PEDIATRICS IN PRIVATE PRACTICE. <i>E. J. Huenekens, M.D.</i> , Minneapolis, Minnesota	48	PHOTOGRAPH, <i>Stephen H. Baxter, M.D.</i> , President, Minnesota State Medical Association	114	
THE DEVELOPMENT OF CLINICAL PATHOLOGY AS A SPECIALTY. <i>Arthur H. Sanford, M.D.</i> , Rochester, Minnesota	52	PRESIDENT'S LETTER	115	
TWENTY-FIVE YEARS OF "MINNESOTA MEDICINE" AND OF ANESTHESIOLOGY. <i>John S. Lundy, M.D.</i> , Rochester, Minnesota	57	EDITORIAL: Early Days	116	
ABDOMINAL PAIN. <i>Arnold Schwwyzer, M.D.</i> , Saint Paul, Minnesota	61	Greetings from the Medical School	116	
EVOLUTION OF NEUROSURGERY. <i>Alfred W. Adson, M.D.</i> , Rochester, Minnesota	66	Twenty-Five Years Have Passed	117	
PROGRESS IN THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE UROGENITAL TRACT. <i>Gilbert J. Thomas, M.D.</i> , Minneapolis, Minnesota	74	Improvement in Mortality Statistics	118	
PROGRESS IN ORTHOPEDIC SURGERY. <i>Melvin S. Henderson, M.D.</i> , Rochester, Minnesota	79	The Incidence of Syphilis	118	
THE PROGRESS OF OBSTETRICS DURING THE PAST TWENTY-FIVE YEARS. <i>W. A. Coventry, M.D.</i> , Duluth, Minnesota	84	MEDICAL ECONOMICS: "Doctor-Shortage"	119	
ADVANCES IN RADIOLOGY IN THE PAST QUARTER-CENTURY. <i>R. G. Allison, M.D.</i> , Minneapolis, Minnesota	87	Rhode Island's Sick Benefit Plan—First in U. S.	120	
PRIMARY BRONCHIOGENIC CARCINOMA. <i>Thos. J. Kinsella, M.D.</i> , Minneapolis, Minnesota	90	Insuring Against the "Third Hazard"	121	
MEDICINE IN MINNESOTA SIXTY YEARS AGO. <i>William Davis, M.D.</i> , Saint Paul, Minnesota	97	Minnesota State Board of Medical Examiners, Physicians Licensed November 13, 1942	122	
IN MEMORIAM				123
INDUSTRIAL HEALTH: For Worker Health and Morale				124
TWENTY-FIVE YEARS AGO				125
REPORTS AND ANNOUNCEMENTS				128
WOMAN'S AUXILIARY				132
COMMUNICATION				134
OF GENERAL INTEREST				135

Contents of MINNESOTA MEDICINE copyrighted by Minnesota State Medical Association, 1943

Entered at the Post Office in Minneapolis as second class mail matter. Accepted for mailing at the special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized July 13, 1918.

MINNESOTA MEDICINE

OFFICIAL JOURNAL OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Published by the Association under the direction of its Editing and Publishing Committee

EDITING AND PUBLISHING COMMITTEE

E. M. HAMMES, Saint Paul	A. H. WELLS, Duluth
PHILIP F. DONOHUE, Saint Paul	O. W. ROWE, Duluth
H. W. MEYERDING, Rochester	T. A. PEPPARD, Minneapolis
H. A. ROUST, Montevideo	HENRY L. ULRICH, Minneapolis
B. O. MORK, JR., Worthington	C. L. OPPEGAARD, Crookston

EDITORIAL STAFF

CARL B. DRAKE, Saint Paul, Editor
GEORGE EARL, Saint Paul, Associate Editor
HENRY L. ULRICH, Minneapolis, Associate Editor

BUSINESS MANAGER

J. R. BRUCE

Annual Subscription—\$3.00. Single Copies—\$0.40. Foreign and Canadian Subscriptions—\$3.50.

The right is reserved to reject material submitted for editorial or advertising columns. The Editing and Publishing Committee does not hold itself responsible for views expressed either in editorials or other articles when signed by the author.

Classified advertising—five cents a word; minimum charge, \$1.00. Remittance should accompany order.

Display advertising rates on request.

Address all communications to Minnesota Medicine, 2642 University Avenue, Saint Paul, or National Bldg., Minneapolis. Telephone Nestor 2641.

ST. CROIXDALE ON LAKE ST. CROIX PRESCOTT, WISCONSIN



MAIN BUILDING—ONE OF THE 5 UNITS IN "COTTAGE PLAN"

A Modern Private Sanitarium for the Diagnosis, Care and Treatment of Nervous, Mental and Medical Cases Located on beautiful Lake St. Croix, eighteen miles from the Twin Cities, it has the advantages of both City and Country. Every facility for treatment provided, including recreational activities and occupational-therapy under trained personnel. Milk, cream and butter from our own herd of Tuberculin-tested Registered Guernsey Cows. Inspection and co-operation by reputable physicians invited. Rates very reasonable. Illustrated folder on request.

CONSULTING NEURO-PSYCHIATRISTS

Hewitt B. Hannah, M.D.
Joe C. Hultkrans, M.D.
511 Medical Arts Building
Minneapolis, Minnesota
Tel. MAin 4672

RESIDENT PHYSICIAN
Howard J. Laney, M.D.
Prescott, Wisconsin
Tel. 39

SUPERINTENDENT
Ella M. Mackie
Prescott, Wisconsin
Tel. 69

Minnesota Medicine

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society

Volume 26

January, 1943

No. 1

PROGRESS IN INTERNAL MEDICINE IN MINNESOTA

E. L. TUOHY, B.A., M.D., F.A.C.P.
Duluth, Minnesota

MY assignment for this issue of MINNESOTA MEDICINE is the development of the specialty of Internal Medicine in our state. Other specialties are receiving similar treatment for the general purpose of giving a review of the quarter-century now ending in which this journal has so well served our profession. I choose to discuss the *background* of internal medicine in Minnesota. Documented reviews are regularly published in various journals, giving the year's progress not only in the field of general medicine but for such subdivisions as cardiology and gastroenterology, and we have such splendid reviews as that on arthritis* prepared by the committee studying that intricate problem. These articles and year books are available to everyone. It may orient the reader the better if I give the following reasons or purposes for this type of review:

1. The internist cannot avoid the responsibility of keeping in step with all advances in diagnosis and treatment wherever they appear.

2. I shall aim to point out, therefore, that he is well adapted to be the special integrator for coöordinating group opinion and interpreting it for the benefit of the individual patient.

3. Much is said about the "science of medicine"; more of what has been accomplished in mass disease prevention (public health). But as life prolongation has obtained, the individual obtrudes as a social unit. The years are apt to bestow upon him more infirmities than blessings; he faces more and more hurdles of disease, degeneration, accidents, economic and nutritional

imbalance. The list has infinite variety; each generation meets these with the physical and philosophical antidotes the period accepts from the past and currently develops.

4. For the forty years of my contact with medicine in Minnesota I say unreservedly there has been no "lag" whatever in giving our population the prompt benefit of all medical discoveries. In fact, we accept a general reputation the equal of any state in the Union. We have met our local obligations, and one of our great Minnesota institutions has given itself to the world and accepted its acclaim. Therefore, in terms of our people they expect little short of the miraculous.

5. Napoleon, surveying his victorious generals reporting to him their accomplishments, is said to have replied, "And what did you do the next day?" For those of us reporting about our specialties it should in some measure put us in our places. Success is another name for "capacity at re-adaptation." Let us keep that in mind.

6. For example, we should put much stress upon the medical problems that an age shift in population (geriatrics) imposes. Our massed action against epidemic and contagious diseases has been as effective as anywhere. But the hazards of degeneration, malignancy and many infectious processes remain. Most of all, the perturbed consciousness turns to science with something like the role of Lazarus at the rich man's door. We cannot bury our psychoneurotics and resurrect them to an effectiveness.

7. I wish to review the accomplishments of our guild in a period long enough after Virchow

From the Department of Medicine, The Duluth Clinic, Duluth, Minnesota.

*Hench, P. S., et al.: Rheumatism and arthritis: Review of American and English literature for 1940. Ann. Int. Med., 15: 1002-1108, (Dec.) 1941.

and Pasteur to have escaped the hardships of accommodation to their monumental discoveries, and to profit vastly by the flood of understanding that came with them. Ours has been the medical era of bacterial causation and pathological anatomical imprints. We never need to apologize for it, despite the fact that it bestowed upon medicine materialistic attitudes. I wish to sketch an outlook for physiology and its allied sciences. A great field of research and clinical application of therapy comparable to the sulfa drugs is opening up.

8. I shall name some of the men of my own time to whom our indebtedness is deep and abiding. Most of all, I wish to make recurring references to the very gifted Frank Fairchild Westbrook, whose stirring picture* I transfer to these pages. The personal debt many of us owe him—the public debt we all owe him—has not been appropriately acknowledged. He deserves a far better Boswell than my powers provide.

Internal medicine has attained a very high standing in Minnesota. Surgery led other fields of medicine in the first two decades of this century. Gradually internal medicine has come into a dominant position.† Let me hasten to add that this has not come through unusual aggression by those in the field, but rather through a yielding on the part of surgeons to the conviction that surgery and medicine are based alike upon the fundamental sciences and upon accurate diagnoses. It is only in the decision as to whether treatment entails some operative technique, in whole or in part, or whether bloodless methods suffice. The closer and complementary association of the two basic specialties has thus come about; and this has not come to pass alone in such group clinics as at Rochester, but in all teaching, general and special hospital staffs as well. The recent exploits in California of an unlicensed but technically trained orderly found operating quite successfully (and voraciously) upon a variety of patients should convince any skeptic that technical skill alone does not produce a competent surgeon. In like manner, an internist critical of and unversed in the possibilities of operative surgery and the time and place for its exposition when indicated, is incompetent in this specialty no matter how erudite he may be or

accurate in his diagnoses. These principles apply to all the specialties, as I shall later comment upon. Most good general practitioners of medicine are really internists, and the reverse holds equally. They should be the first to pass upon most chronic disabilities of adults and many acute disorders as well. This job of being a clearing house for other specialties may, however, be neither profitable nor comforting where the public too avidly adopts specialism and the specialist is so lacking in inhibitory faculties that it may not be easy to distinguish him from the California orderly. So much for definitions and delineations.

Regimentation and Medical Assignment

We are occasionally reminded of the chagrin of some of our brethren in the armed forces who are delegated to nonmedical or "book work" duties. In the face of military emergencies this seems inevitable; but in the broader sense it is only one aspect of the general regimentation that comes to all business and vocations where a "planned economy" supervenes, regardless of its type or source. Laymen (social workers or otherwise) are not intrinsically despicable simply because they would wish to see all our medical work organized in mass moves at eradication of any material or emotional (soma or psyche) obstacle that obstructs in their devisement of an economic Utopia. In fact, such mass action under our own guidance has gone a long way in the eradication of communicable disease (diphtheria, smallpox, typhoid, malaria). Institutionalizing the tuberculous has greatly limited that scourge; it has done little, however, to check mental disease; and veterans' hospitals are for the most part doing no better with the high percentage of their anxiety-oppressed patrons. Not a few of these use their afflictions as a shield against adversity and the hospitals as a dietetically ideal parking lot.*

The internist cannot afford to conclude that any complainer's afflictions are "functional" until he has proven by painstaking routine that objective disease may not be a factor, but various estimates agree that where this care is taken at least 75 per cent of our patients are functionally disordered and mass attempts at their cure offer

*This photograph is taken from "Forty Years of the University of Minnesota." It was edited by the late W. W. Folwell, and published by the General Alumni Association in 1910.

†Staff Meeting Bulletin, Hospitals of the University of Minnesota, p. 393, June 5, 1942.

*This must not be construed as any criticism of the medical staffs of these hospitals. Where medical service is contingent upon any other factor than the individual physician's decision, then those with subjective distress abuse the privilege and burden the system.

little. The records of most charitable dispensaries yield the proof of that statement. For one item, there is so little of the opportunity at *integration* on the part of some well-poised guide whose purpose it is to assemble the findings of all tests and specialists in the manner so well outlined by Professor Barker of Johns Hopkins. I introduce this statement for two reasons: (1) because it touches to the core the matter of the abuses of excessive specialism; and (2) because the internist is by necessity as well as training the best integrator. I propose to discuss the route by which most men of this period have attained the specialty of internal medicine. Some of the younger men entering the profession may be interested. It gives me an opportunity to introduce to them certain personalities to whom they are deeply indebted, albeit in the current of their hasty and turbulent training there is little opportunity to give them much of an immediate not to say remote historical background. Specialties in medicine are with us to stay. Those entering into the specialties must not delay their preparation too long. The more cloistered and limited the field, the less need there may be for a broad foundation. A. J. Carlson's comment is, as always, very thought-provoking: "The conscientious practise of modern medicine is becoming so complicated and costly as to almost exceed the intellectual capacity of the ablest men. Again I see no cure for this. Who shall bear the necessarily increased cost of modern medical service, the individual or society? I do not know the wisest way." No, indeed. They say we are fighting two wars: a horizontal global war, which we shall win; and a vertical class and racial war, the end of which awaits a millennium. Society is not likely to accept our past record (notable as it is) in yielding to us a continuance of our rugged individualism. In the matter of life prolongation, elimination of preventable disease, promotion of individual comfort and efficiency, we have established indeed a challenging record. Science has found in its linkage with medicine one of its greatest agencies for man's beneficence. When we speak of freedom we must never forget that the freedom of the will has been guaranteed by a higher authority than any court or ruler. Men go neither to heaven nor to hell in mass groups. Kipling put it: "The sins they do by two and two, they must pay for one by one." No specialty within medicine, with the single

exception of neuropsychiatry, demands such a broad understanding of the human consciousness as does internal medicine. Routine procedures, impersonal approaches, are consonant with problems of epidemic or military necessity. Surgery began with the treatment of war emergencies (Ambroise Paré). War has always advanced the surgical field; internal medicine thrives on periods of peace. There is the need of reflection—philosophical periods of retreat (Osler). The "natural born internist" does not exist. He comes into his greatest usefulness when he scans the current medical literature with unflagging zeal, when he sharpens his own powers of observation thereby, and when he has had enough contact with the classics* so that he finds peace and relaxation in rereading his own favorites. If he qualifies under these headings we may well permit him to venture the thrombosis of his own coronaries through misguided physical exertion for which he is untrained but which yields him rare delight.

Great Medical Personalities In Minnesota

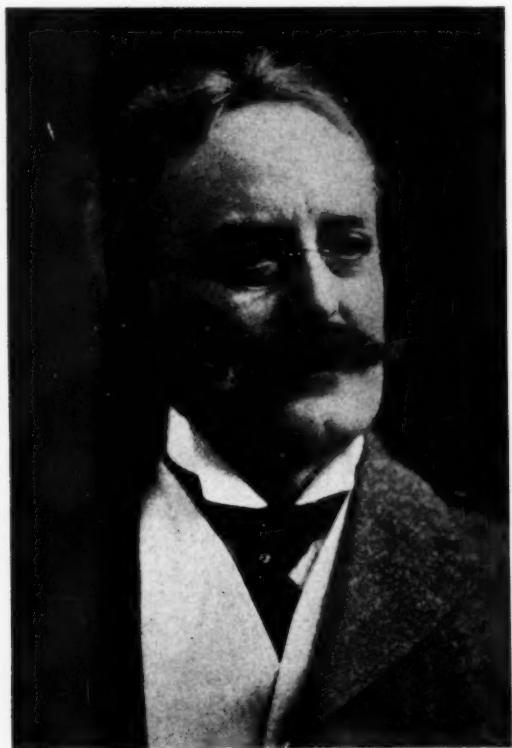
I choose to go back only to the period of my own tutelage, where my own contacts furnish the material. I trust this comment† may secure for me some indulgence and rescue me from the opprobrium of autobiographical verbosity.

Charles P. Sigerfoos had a profound influence upon those of us who took our academic training at Minnesota. He taught biology, and led classes in zoology, physiology and embryology. Since the microscope became such an important instrument for research in medicine and establishing better clinical diagnosis, this great teacher deserves particular mention, although he never had any direct contacts with the Minnesota medical faculty. I think I am right in stating that Hal Downey secured his urge and began the development of his interests within Sigerfoos' department; and everyone knows of his great contributions in the field of hematology, begun when he was a relatively young man. Scores of others, like myself, at least were introduced to a world of interest opened up by the microscope; we were made ready for the grounding in microscopical pathology that was later available. Twenty years slipped by, however, before the con-

*Under the term "classics" should be catalogued many resources other than books or essays. Many pay lip service to Cervantes, Bacon, Shakespeare and Montaigne; but never read them. The American Physicians Art Association held an exhibit at the A.M.A. meeting in Atlantic City in June, 1942. There are several doctors' orchestras and a great many nonplayers are arch collectors of symphonic records.

†And save me from censure for leaving out the names of so many equally deserving.

sciousness dawned upon me of the influence that that charming, punctilious and precise educator, Professor Sigerfoos, had upon me. Many others have expressed to me the same feeling of sincere devotion to that rare teacher.



FRANK FAIRCHILD WESBROOK

The question is often posed by anxious parents: "What is the best choice of subjects for those hoping to matriculate in medicine?" The inquiry is not easily answered. Studies such as I have mentioned above certainly molded and prepared me. Perhaps, however, in my philosophical moments I am replaying some of the memory records grooved by contact with the beloved and gracious Maria Sanford; or I am disking from a matinee with that vivid genius of psychology, Harlow Gale; or a rollicking chant with the gifted "Dickie" Burton—he never to be forgotten—his Shakespearian course gone to mold along with the dim recollections of Henry Irving and Walker Whiteside. After 1914 and 1929, despite attempts at playing the old records, I was able to reproduce only an occasional strain of Anderson's facile historical cataloguing of

the countries in continental Europe; and some figures by economist McVeigh—methodical social and political balances; but need I add that much has happened to European schedules and the world's economic stability since the above fateful years were ushered in?

Frank Fairchild Wesbrook

I consider that Wesbrook was responsible, more than any other man, living or dead, for medical undergraduate teaching in Minnesota. He was the most attractive personality I have ever met. I admit at once that in so far as he is concerned I am guilty of hero worship. In many ways I have no right to claim him for the specialty of internal medicine, because he obviously was primarily a bacteriologist and pathologist; nevertheless, as I scan the period of approximately a quarter-century since his death in 1918, I conscientiously feel that the ideals and schedules of teaching, the correlation of all forces for the control and the alleviation of disease were all a part of his superb consciousness. Long before others grasped the idea of one medical school within our state, attached to our university not as an appendage but as a living, active, dynamic force therein, he blueprinted the prospective development of our medical school—an accomplishment we now so proudly survey. Too little has been said about this great man and this lovable character. This was brought home to me forcefully a few years ago when a teacher here for a short period asked me on occasion something like this: "Who was this man Wesbrook about whom so much is said and who seems to have left so little in the way of research?" I felt no resentment at this remark; I hope I did not show it. But a great nostalgia came over me, out of the feeling that after all this inquirer, bent chiefly toward research problems and output, was right. No one ever desired more eagerly and wistfully to devote his life to research than did this glorious individual who, in 1906, became the dean of the College of Medicine and Surgery at Minnesota, and held that post until January, 1913, when he was made president of British Columbia University. For the sake of the records I beg leave to give you a short résumé of Wesbrook's life.*

*I have secured the details pertaining to Wesbrook's earlier years from his brother Donald. Donald and Beth Wesbrook are now living in East Barnard, Vt. When the Wesbrooks came to Minneapolis the much younger brother Donald lived with them. He ultimately graduated in engineering at Minnesota. He married Beth Barney, daughter of a well-known family in southeast Minneapolis.

INTERNAL MEDICINE—TUOHY

Canadian born, July 12, 1868, he had coursed through his preliminary training (London, Ontario, and Winnipeg, Manitoba) and had attained a B.A. degree when he was only nineteen. Three years later he had an M.A., an M.D. and C.M. from Manitoba University. He had had an internship and a short period as a railroad surgeon at Banff, Alberta, and found himself a year later taking the famous maternity course at the Rotunda Hospital in Dublin. Perhaps this item explains why, when I first met him, fellow faculty members called him "Paddy." Something else came up, however, and the next three years found him doing research in pathology at Caius College, Cambridge. He had secured and won the John Lucas Walker fellowship. He spent three years thereafter gaining further experience in the King's College and St. Bartholomew's hospitals in London, and spent considerable time in Germany, particularly at Marburg. In this period he had many continental contacts, to which he often referred. He met the great researchers of that post-Virchow and Michael Foster period; he brought back with him to Canada in 1896 that Promethean medical fire that so many others like him have spread around the world and so continue to do. His own university (Manitoba) gave him the call for the professorship in pathology. He did not remain very long in Winnipeg because he was called soon thereafter to become professor of pathology and bacteriology and public health at Minnesota. He had, however, taken time to marry the daughter of Sir Thomas and Lady Taylor. Sir Thomas was chief justice of the supreme court of Manitoba.

This is just a recital of who he was and where he had been, but that succession of dates and appointments does not reveal the man. Any one observing him swinging across the campus would not need to be told that he had won medals at home and in England for proficiency in running, jumping, pole vaulting, bicycle riding, shotputting, as well as both single and shell crew rowing. When I knew him best he was a member of the Athletic Board of Control. He was the most gracious of hosts and the most charming of companions; but let no student ever presume upon such acquaintance as these opportunities might bestow as an occasion for any letdown of the standard he set within his departmental teaching. He would swing into the lecture room with an agility reminiscent of his pole vaulting; for a

few moments he would vault into his prepared lecture, but like many geniuses he was apt to wander off on other sidelines, promoting considerable confusion in the student's notes. If one was able to catch some of these sidelines and his enthusiasm that was enough. Some of the best lecturers, after all, are the poorest teachers. Well, wherever Wesbrook joined any group he soon became the center of animated conversation. His clothes always fitted him well but were never ostentatious; he kept himself well groomed. He was a connoisseur of meerschaum pipes. He allowed his friends (and others) to take up a great deal of his time. He was a gentleman to the core, and he acted the part even toward those whom he did not like. As a result of all this and of his official position he was placed upon endless committees and faculty appointments. No assignment of this type ever became so onerous (and so productive of good) as his directorship of the laboratories of the Minnesota State Board of Health. The late H. M. Bracken, Secretary of the Board, lived but a few doors away from him (near Tenth Avenue Southeast, Minneapolis). It was Wesbrook and Bracken who sent me to Duluth in the summer of 1905 to open the branch laboratory for the State Board of Health at St. Mary's Hospital. I was soon to learn why Frank Wesbrook was never to be granted any time to do that research for which he was so superbly fitted when he came back from Europe to Canada when he was only twenty-nine years old. The research opportunity which he so much craved has since fallen into the most competent hands of such workers as Cecil Watson and Wesley Spink. He would be immensely proud of them, even as we all are. But, Minnesota was pioneering medically. Great general surgeons were developing at Rochester; Minnesota had great clinical teachers, but aside from those like Louis Nippert and Arnold Schwyzer (European trained) they were mostly trained in the Osler tradition, and lacked his contact with the clinical laboratory and the post-mortem table. Minnesota might also have boasted of rollicking adventures with smallpox, a typhoid rate that competed for ascendancy with any in America, and aside from a lone protesting voice, such as that of Longstreet Taylor of Saint Paul, tuberculosis, with its terrifying incidence among young adolescents, was accepted everywhere,

even as the Indians had accepted it after the white man came.

H. M. Bracken was indefatigable. In his official position as secretary of the State Board of Health he kept Wesbrook in a stew a large part of the time bolstering up his blitzkrieging officialdom. And yet, let me add at once, Bracken was usually right. He had had some experience before the mast. He absorbed no profanity from this service, but others took the incentive thereto from him. Wesbrook, the diplomat, spent precious hours and days mollifying people to whom Secretary Bracken had sent blistering letters, presently reminiscent of a cabinet member in Washington who, among a thousand other aggrandized duties, is custodian for the Indians. Like the present cabinet member in Washington, Bracken[†] was noted for his bluntness more than for his obvious knowledge of the possibilities of public health.

Frank Wesbrook left medicine to accept the presidency of a university (still largely in prospect) when he was only forty-five years old. He died of hypertensive cardiovascular disease at fifty. I have had much to do with treating hypertensives. For three years now statistics which I have accumulated show that of all the patients we have seen at the Duluth Clinic since 1915, and where we were able to trace the deaths, just about 50 per cent died of cardiovascular renal disease, with or without cerebral complications. The average age, however, is about sixty years, and a recent medical writer has stated that at forty-five a doctor is at the height of his value to the community and his profession. At least ten years of Frank Wesbrook's life were ground out and destroyed through useless controversy and nonproductive administrative duties that never should have been his. His standing as a scientist is abundantly attested to by the fact that he belonged to the Association of American Physicians, the Association of American Pathologists and Bacteriologists, the London Pathological Society, the Pathological Society of Great Britain and Ireland, the Society of American Bacteriologists, and the American Physiological Society. In 1905 he was elected president of the American Public Health Association. He was honored by the United States Government in making him a member of the advisory board of the hygienic

[†]One of his major legacies to Minnesota was the Piersons. In the field of administration and vital statistics in the secretary's office at the capitol in Saint Paul, they have been invaluable.

laboratory for the United States Public Health and Marine Hospital Service. Who, I ask you, among our present researchers, is going to equal that record? When it came to the matter of adjudging the University of Minnesota medical school for certification as a Class A school it was Wesbrook who convinced Abraham Flexner of the Rockefeller Foundation that Minnesota had a school with a Class A destiny.

The influence of this great character and personality became apparent early. The intervening years have only attested Wesbrook's great capacity to stimulate others.

Louis B. Wilson, a Saint Paul high school science teacher and a genius in his own right, became Wesbrook's "first-born" in his scientific family. Years after Wilson was absorbed into the great clinic at Rochester, Wesbrook would almost tearfully refer to him as parents now speak of their sons called to war—a great and needed service and a glorious opportunity. To a recent generation who know Wilson chiefly as the genial ogre dispensing the benefactions of the Mayo Foundation, it should be told that a great surgical center was blueprinted by him, to develop into the great scientific, teaching and medical diagnostic center now universally acclaimed. Other men followed in rapid succession—men who have made medical history in Minnesota. Some, like Bob Mullen and Tommy Martin* (my associate), did not long survive Wesbrook—but they had acquired the touch of genius. Harold Robertson came and followed Louis Wilson to Rochester, where he turned the cold and rigid light of necropsy analysis upon the handiwork of the oldest to the most recent recruits in service. Medical history was indeed unfolding. To what beginnings we had made in Duluth, Robertson sent to us George Berdez, and our clinico-pathological conferences at St. Mary's Hospital have carried on uninterruptedly for twenty-two years. Conferences to include roentgenologists and physiologists promise for the future the best method of integrating the activities of all specialists with the main medical

*I have made no mention of x-ray in this review. Too much credit cannot be given to roentgenology in this period. I procured the first workable fluoroscopic unit used in Minnesota. Returning from Vienna in late 1912, after seeing the work of Holzknecht and Kreisfuchs, no one could provide me with any similar apparatus. Hearing that Case at Battle Creek, Michigan, had a handmade working unit I visited him. A Chicago firm made a machine for me following Case's instructions. I never became proficient with it but Martin did. Gastro-intestinal fluoroscopy (so diagnostically essential) is one of the most exacting techniques. Relatively few men are capable of becoming experts in the field. The late R. D. Carman was soon to demonstrate its possibilities at the Mayo Clinic.

current of the period. Men who did not remain long in Wesbrook's laboratories or came in later, as for example, Marx White, the late Arthur Hamilton, Moses Barron, and many others, have been among our best clinicians and teachers.

It is trite to restate that our guild has made more advance in the healing art since the turn of the century than in all preceding time. These accomplishments have multiplied responsibilities and complexities far beyond the permanent prestige they have bestowed. We happen to be living in the most violent social and economic era of all time. All specialists are too prone to attribute our present life extension to their efforts given to the individual sick. We are prone to pass over to bureaus and bureaucrats the management and sustenance of public health activities. Minnesota has been favored beyond the average state in this regard because political maneuvering has not cut into our administrative health activities. We are indebted for this in no small degree to the well-laid plans of both Wesbrook and Bracken and to the distinguished men and women whom they directed into public health work. First credit in this connection must be given to Dr. Orianna McDaniel who, for many years, worked very closely in the laboratories of the State Board of Health with Dr. Wesbrook, and who became his successor. Dr. Albert Chesley grew up, medically speaking, with the department. He worked with the laboratory while a medical student. Later he profited greatly from the pioneering in epidemiology in Minnesota by H. W. Hill.* Chesley thus secured a grasp of administrative health problems that comes to but few in any generation. Fortunately, he had the physique and personality enabling him to acquire the dynamic urge of Bracken, the ingratiating poise of Wesbrook, and the statistical trend (mathematics) of H. W. Hill. Our profession is deeply indebted to him, particularly in these times of political usurpation, when our professional birthright could be so easily exchanged for political pot-

tage. We face the superinvolved issues of the global peace that some time will follow the global war; we need a continuance of the most alert public health programs, because with modern transport methods the spread of diseases and their vectors is only exceeded by the rapidity of the spread of ideologies.

In order that the specialists of the future may profitably service self-sufficient patients, the latter must not die in youth or be maimed later by epidemic encephalitis, poliomyelitis, malaria, or rickettsial infections. Undernourished, impoverished, downtrodden populations are unable to accept and carry out, let alone support, standards of individual medical care to which we have attained. It behooves us, therefore, to recall our indebtedness to the field of public health, and again I must refer to Wesbrook's contacts with it. He was of the generation that produced Adami, Theobald Smith, William H. Welch (Baltimore), Park (New York), and Livingstone Farrand (later President of Cornell University). He was intimate with all of them. They had in common the zeal to spread through the Americas the lifesaving precepts that those after Koch, Loeffler, Pasteur and Von Behring were developing. Wesbrook often spoke of his contact with Klebs and Metchnikoff. After war service in France in 1918, Albert Chesley was sent by the Red Cross into Poland, where typhus and other epidemics were assuming threatening proportions. We may know from this background that it is no accident that our state health administration is qualified to meet any world emergency. It is time to ask ourselves, Are we individually as well qualified? I ask this question with no intention of fashioning an answer. I wish to comment upon the Minnesota medical field as I see it; and especially upon the educational facilities and agencies through which we may hope to retain standards of usefulness entitling us to evade demeaning regimentation.

Maintaining Standards of Medical Education

E. T. Bell, professor of pathology at Minnesota since 1920, and with the department since 1911, has followed in the Wesbrook tradition with a fidelity of purpose and research ability (kidney pathology) that is everywhere admired and acknowledged. He and his staff have packed into their teaching schedules no summation of canned textbook extractions, but vivid daily observations of all that is seen in the ward, developed

"H. W. Hill was Canadian-trained. He remained in Minnesota up to 1912, when he returned to London, Ontario. He returned, however, to Minnesota, a number of times, and once directed the Minnesota Public Health Association. He is living in Minnesota now, but in retirement. He deserves a very high place in recounting our public health accomplishments. In 1906 I accompanied him and saw him in action when we studied typhoid epidemics in Hibbing, Cloquet, and other northern cities. There certainly was much to do to develop proper water supplies and sewage disposal. Neither typhoid vaccination nor water chlorination had yet been developed. Frederic Bass and H. A. Whittaker were still to give us their great services from the mechanical and chemical engineering side. I recall that Hill kept repeating, "Why, we have had more typhoid this year, either in Cloquet or Hibbing, than has the whole state of Massachusetts!" That was the challenge that he met.

at the operating theatres, and found at necropsy. We shall continue to have the right kind of doctors if they have his type of basic training. The student entering his classes in his final two years encounters no new vocabulary or confusing technique. Clinical concepts are naturally implemented into the basic pathological instruction. When the student becomes an intern, and later in any type of staff organization, he is able to hold continued contacts and counsel with the clinical and tissue pathologists. I mention this obvious situation (now obtaining in all Class A medical schools) not only to give credit where it is due but to point out that this fortunate sequence does not obtain in the field of physiology and its allied sciences.

Medical Journals and Publications

The world-wide exchange of medical ideas arises from our splendid and varied current literature. Keeping up with it even in a limited field has left so appalling a task that it must be made to yield satisfactory recompense. Endless and fatiguing reading is not the answer. Some men have an uncanny capacity for collecting from the medical literature the very items they are able to use in their current practice and apply in cataloguing their daily experiences. Let me illustrate in terms of some of my Duluth associates. In 1927 Lloyd Merriman* was called to the western part of the state to see the mother of a dentist confrere. She had a curious typhoid-like illness that had been very puzzling. By recalling a short note that he had seen in the *Journal of the American Medical Association* he was led to make inquiry concerning the skinning of some rabbits which had preceded her illness. He was able to prove, through specimens sent to the U. S. Public Health laboratories in Washington, that the disease was tularemia. He has been given, therefore, great credit for this "first" in Minnesota. Within a few weeks a fox farm operator on the North Shore came into St. Mary's Hospital; he lived only a few days. An intern, imbued with the remark he had heard about Dr. Merriman's experience, awoke to the situation of the man's scarred finger and axillary adenitis just in time to send a blood specimen to the late Dr. Edward A. Francis. An autopsy was steadfastly refused until the term "rabbit disease" was suggested, and then

*Merriman, Lloyd L.: Tularemia: a comparative study of four cases originating in Minnesota. *Minn. Med.*, 10:719, (Dec.) 1927.

everyone, including the undertaker, was most zealous for an examination. Drs. Richard Bardon and George Berdez† were able to report and send a specimen to Dr. Francis of this first autopsied human case of tularemia with a caseating pneumonic process in the United States.

As a result of his wide reading and extraordinary memory, Dr. Frank J. Hirschboeck has an imposing series of "firsts." His was the first report received for publication in the United States on massive atelectasis of the lungs. A man developed bilateral atelectasis after an abdominal operation. These are Hirschboeck's own words: "I remembered having read an article by Tingley and Elliott in the London *Lancet*, published in 1911, in which they reported eleven cases of massive atelectasis following surgery . . ." Scrimger of Montreal, Canada, had reported the condition in February, 1922. Hirschboeck's* report came out in early August, 1922. Hirschboeck made the first report in Minnesota to the State Board of Health on a case of lethargic encephalitis occurring at Carson Lake, Minnesota. In making this report he referred Dr. Green, epidemiologist for the State Board of Health, to an editorial he had read explaining the disease. He made this report in March, 1919. He correctly diagnosed another case one month later, after listening to the symptoms as related by the late Dr. A. J. Braden. It requires an agile memory to bring to mind something you have read six years previously. Schultze, in Germany, reported an instance of agranulocytosis in 1922. Hirschboeck recalled this and correctly applied the diagnosis to a patient of Dr. W. G. Strobel, whose death occurred on February 4, 1928. Hirschboeck later reported this case to the Minnesota Society of Internal Medicine, but he did not publish it. He has others which appear equally uncanny, but I recite these evidences less to remark the genius that he is than to point to a masterful way of utilizing medical texts and articles. Next to the credit that comes from first describing a disease or syndrome should come that for recognizing it from the description and interpreting it to one's fellows. MINNESOTA MEDICINE has been the outlet for much of that type of reporting. It performs for our district as does the *New England Medical Journal* for the region medical-

†Bardon, Richard, and Berdez, George: Tularemia: Report of a fatal case, with postmortem observations. *Jour. A.M.A.*, 20:1369, (Apr. 28) 1928.

*Hirschboeck, F. J.: Postoperative massive collapse of lungs. *Am. Jour. Med. Sci.*, 164: 268, (Aug.) 1922.

ly tributary to Boston. This type of journal as well as the so-called "pure research" journal, each has its place. The results of "pure research" often attain applicable clinical interpretation only after it has been transposed by working clinicians into the papers that make up the programs of our numerous medical societies.

Special Medical Societies

Complaints have come on occasion from our county, state and American Medical Association administrative officers that a surfeit of special societies has withdrawn program support from them. The implication is that those offering original material prefer to give it to societies of specialists and to specialist journals. There is no need for alarm. It works the other way. Men certified for special societies attain to that position by their efforts at limitation of their field and perfecting themselves within it. Certification by boards is only a formal way of standardizing and adjudging candidates and the reports made of their work. The regret is that general program builders find it difficult to induce general practitioners to pledge themselves to give papers; and it is true that "headliners" are sought out to attract attendance at meetings. The result is that all therapeutic advances soon get to the general practitioner and he uses them well to the extent of his diagnostic ability.

Leonard Rowntree while in Minnesota was one of the prime movers for starting and developing the Minnesota Society of Internal Medicine. The membership of sixty has provided a place for representative internists from the Twin Cities, Rochester and Duluth. The aim is to include more men from the smaller cities as they are certified. The Mayo Clinic and the University faculty members have given great impetus to this society. I hold it (with its two meetings yearly) to be the most helpful and stimulating of the many to which I belong. The meetings are open to invited guests from adjacent states. The consolidated programs, with ten-minute papers and five minutes more for discussions, rivet the audience's attention and develop lucid expression. All praise to the specialist societies. Next to the current literature they inhibit "lag" in the "March of Medicine."

The American Colleges and Graduate Education

The College of Physicians had one of the best of its annual sessions in Saint Paul in May, 1942. Bringing the meeting to Minnesota (a signal honor) was largely the accomplishment of Dr. John Lepak of Saint Paul. The college plans to meet the demand for some method for special training of internists seeking either certification or refresher courses. Cecil Watson at the university and Edgar Allen at Rochester planned two-weeks courses to groups of sixty men each just prior to the Saint Paul session. The courses were most enthusiastically received and praised. Such graduate courses have been given preceding the annual college convocations for five years. The war is likely to interrupt them, but regional meetings should be planned not only for the men at home but those in the armed forces as well.

This educational program is the most profitable goal of the American College of Physicians. There are all too few places available for graduate fellowships in medicine. Minnesota is pre-eminent because of the Mayo Foundation and our university. The future must develop more such facilities; and with the multiplication of government and military hospitals some coördinated plans should be easily worked out. Hospitals designed for various military exigencies (orthopedic, psychopathic, facial and dental reconstruction) are already on the way. It is time to deviate widely from the basic ideas of physical reconstruction and attack the more common and complex problems of functional imbalance.

Physiology, Pharmacology, Anesthesiology

These fundamental sciences provide the same avenue of approach to homeostatic imbalance that pathology and bacteriology have given us for so-called "organic disease." Whether in peace or wartime we need more neuropsychiatrists and fewer surgeons is a question. I have traced how internal medicine has profited superbly by additions to the field of men trained in bacteriology and pathology. More men should come into the field similarly trained in physiology and its allied sciences. Carlson, Cannon, Ivy and Wiggers have been showing the way for two decades. Mann and his coworkers at Rochester have given the impetus to scores of the Mayo clinicians (all branches): liver disease (Snell and Butt); vascular disease (Brown, Allen, Willius, Horton)—

all leading toward physiological and pharmacological exploitation. One of the meatiest books ever written on the heart was by the late Arthur Hirschfelder* of our department of pharmacology. Yet after he came to Minnesota from Johns Hopkins he lost all contact with clinical teaching. I am not imputing blame or criticism. I am simply stating a fact: few interns from any medical school in the past twenty-five years have ever admitted (to my pointed question) that the intellectual inoculations they got in the sciences, allied to and including physiology, ever worked longer than to confer temporary immunity to the blight of the final examinations. This is outrageously wrong. A few men have seen the light. Henry Ulrich received a permanent inoculation at Johns Hopkins. Among his many contributions has been his molding of the Minnesota Heart Society, and insistence upon the cultivation of physiological understanding. Hilding Berglund,† when professor of medicine, brought the greatest gathering of distinguished medical scientists ever to assemble in Minnesota. It was for the purpose of an organized symposium on kidney disease. Recall the distinguished names from home and abroad: Richards from Pennsylvania, Volhard from Frankfort-on-Main, Isidore Snapper from Amsterdam, and many others. Physiology and pharmacology were co-equal with pathology in the review of research and clinical application. George Fahr, with his students, has brought the spirit of clinical physiological approach to his routine and research at the Minneapolis General Hospital. John Lundy has made history in a greatly expanded field of anesthesiology at the Mayo Clinic. What he is doing largely for surgical patients must be expanded to cover many technical phases of pain relief in general and the methods to keep the body constants stabilized.

The Center for Continuation Study

Medical schools do little more than plant the seed that replenishes the guild personnel. Thereafter there remains much to be done in the period of cultivation. Not all fields and soils are alike. Different purposes and products are best

served by judicious individual selections. It is so with doctors. It will be a sad day when regimentation makes doctors all alike, even as post-office clerks.

The continuation service center at the university meets the needs of our calling in a manner made very obvious by the extent to which its exquisite accommodations have been used for medical sessions. It is not easy for some of us to clearly dissociate the building from our medical mentor, William A. O'Brien. His tact and enthusiasm have been invaluable. His radio work on behalf of the public is a popular presentation, enlightening, informative, and just enough of medical appeal so that it misses evangelistic exhortation. He knows doctors as do few men—their needs, idiosyncrasies, "pet peeves," and what they like. This has given him much insight into medical staff and program organization. The Staff Meeting Bulletins, under the technical assembling of Gertrude Gunn, reflect all this. It was in the "Gossip Column" in one of the 1942 issues that I first learned that the specialty of internal medicine was in first place in Minnesota. It was further noted that medical visitors to the University Hospitals commented upon this and congratulated Professor Wangensteen upon his development of physiological principles in surgery.

Let us aim to make physiology, pharmacology and anesthesiology a working division right in the midst of our clinic problems. It is incumbent upon us to have modern anesthetists in our hospitals without delay. Perhaps in war service some preliminary training may be given to men qualified for this service. But over and beyond any immediate emergency utilization, as for shock, burns, blood bank service, et cetera, looms the much bigger problem of the psychoneurotics and the insane. The next quarter-century should plan to do something for them through studies of their physiological imbalance. It does not seem especially hopeful simply to house the insane. Functionally disordered folk (anxiety neuroses) are found for the most part among our most civilized people. Let us study civilization.

*In London in 1912 Sir Thomas Lewis asked me about Hirschfelder's clinical services and remarked that they must have been extensive because of his book, Hirschfelder, Arthur Douglas: *Diseases of the Heart and Aorta*. J. B. Lippincott Co. Three editions, 1910, 1913, 1918, respectively.

†These lectures were later edited and arranged by Berglund, Medes, Huber, Longcope and Richards. Lea & Febiger, 1935.

Addenda.—The *Journal of the American Medical Association* (Dec. 5, 1942) saw fit to RADIO from Moscow Lepukaln's report upon the War Surgery in Russia of "Academician Burdenko." The reader will note at once the physiological basis of the Russian research and how fully it guides their newer surgery.

CORONARY DISEASE

Certain Significant Contributions Made During the Last Quarter Century

FREDRICK A. WILLIUS, M.D.
Rochester, Minnesota

IT IS fitting that this commemorative issue of MINNESOTA MEDICINE, marking the completion of twenty-five years of constructive editorial effort, should contain certain reflections on the medical progress made during its existence. While the medical sciences have made almost unbelievable progress, civilization as a whole has been regressive, as indicated by the fact that at the time of the issues of Volume 1, Number 1 of MINNESOTA MEDICINE most of the world was at war and again, with the appearance of Volume 26, Number 1, virtually all the nations of the world are gripped in mortal conflict. It is lamentable that the advances in medicine, designed to prevent and control disease, to ameliorate suffering and to prolong life, could be devastated by the ruthless slaughter of countless human beings by demonic forces of destruction. This paradox is a challenge and demands the greatest effort of the medical profession, now and after victory comes, to make a repetition of this catastrophe impossible.

The advances in cardiology have been so great and numerous during the last quarter century that it seems desirable to limit this review to a single phase of the subject. So outstanding have been the contributions dealing with coronary disease that an entirely new philosophy has been evolved, not only concerning itself with the coronary circulation, but integrating itself inseparably into the entire subject of cardiovascular diseases. Even in this one phase of cardiology it is impossible to acknowledge the efforts and contributions of all the workers who have made progress a reality.

Anatomy of the Coronary Circulation

In 1918, F. M. Smith,⁶⁰ studied the coronary arteries of man and the dog by injection methods and roentgenologic depiction of the circulation. His studies indicated a close similarity in distribution of the main vessels in both man and the dog and he concluded that on this basis the dog's heart was suitable for experimental purposes. He

also demonstrated small anastomotic branches between the arteries of the right and left ventricles.

Three years later (1921), Gross published his important monograph dealing with the blood supply to the heart. This very comprehensive work comprised a study of many specimens of the human heart, both normal and pathologic. Injection of opaque media and subsequent roentgenography afforded remarkable opportunity for comparative observations. Unusually small vessels were clearly visualized and anastomotic vessels were readily demonstrated. The distribution and ramifications of the arterial tree were studied and the distribution of the circulation in the various periods of life was compared. Gross concluded that a relative regression of the arteries of the right side of the heart occurred as age advanced. This contention, however, has been disproved by subsequent studies. Gross' work was outstanding and opened the way for subsequent studies, all of which have been contributory to a clearer understanding of the coronary circulation.

In 1924, Oberhelman and LeCount called attention to a most important observation regarding the coronary arteries. They emphasized the great variations which occur in the distribution and ramification of the vessels in individual cases. Their observations have been repeatedly verified by subsequent investigations.

Wearn,^{65,66} four years later, called attention to the extensiveness of the capillary circulation of the heart and discussed the role of thebesian circulation under normal and diseased conditions.

Whitten's studies⁷¹⁻⁷⁸ (1928, 1930) of the coronary arteries were outstanding. Using the injection-corrosion method with a differential color scheme for the arteries of the right and the left sides of the heart and the veins, he demonstrated certain fundamental facts. One of the important observations was that in most hearts the posterior basal surface of the left ventricle is supplied by branches of the right coronary artery and that when sudden closure of the right coronary artery occurs the resulting infarct is not situated in the right ventricle but involves the

From the Section on Cardiology, The Mayo Clinic, Rochester, Minnesota.

posterior basal surface of the left ventricle. He also demonstrated the differences in the general architecture of the right and the left coronary arteries. The right coronary artery is smaller and more superficial and has gradual ramifications while the left coronary artery is larger and has deep penetrating branches issuing at right angles to the main artery. He also showed that the right coronary artery as soon as it contributed to the supply of the left ventricle lost its architectural characteristics and assumed those of the left coronary artery.

Physiology of the Coronary Circulation

During this span of years, investigators have carried out exhaustive studies dealing with physiology of the coronary circulation. Outstanding among these contributions have been the careful researches of Anrep and his co-workers¹⁻⁷ which are so comprehensive that only generalities can be discussed. Experiments were conducted both with the denervated heart-lung preparation and the innervated mammalian heart. Their work clearly showed that in the denervated heart-lung preparation arterial blood pressure was the chief factor influencing coronary blood flow. In this type of experiment no significant change in coronary blood flow occurred during phases of cardiac acceleration. These workers employed the hot wire method and, after slowing the heart by cooling, stimulated the ventricle to contraction by single induction shocks. They concluded that the effect of cardiac acceleration on the coronary blood flow depended on the combined effects of the change of duration and the strength of the resulting premature contraction.

Anrep and his co-workers further demonstrated that the compressing effect of the contracting heart muscle was capable of diminishing coronary blood flow. Increases in coronary blood flow occurring with increased cardiac output in the innervated heart were shown to be of reflex origin for this effect was abolished after section of the vagi. The action of a wide range of drugs on the coronary circulation also was investigated. It was shown that drugs capable of elevating arterial blood pressure also were capable of decreasing coronary blood flow during systole and of increasing it during diastole. Extracts of the pituitary body greatly reduced the coronary blood flow. In progressive spontaneous myocardial failure it was shown that the dis-

charge of blood from the coronary sinus was diminished as much as 30 per cent.

Notable studies have also been contributed by Essex and his co-workers.^{22-27,30,35,68} Their various studies have been conducted by means of a thermostromuhr according to the method of Essex, Herrick, Baldes and Mann.^{8,25} Using the heart-lung preparation, their conclusions agreed with those of other workers that the coronary blood flow depended greatly on the mean arterial pressure. No effect on coronary blood flow was observed with changes in cardiac output provided the arterial pressure and the temperature of the perfusing medium were maintained at constant levels. Coronary blood flow was increased on an average of about 150 per cent when the cardiac branches of the stellate ganglion were stimulated and this effect was believed in part to result from a vasodilator action of the sympathetic nerves. Contrary to Anrep's belief, Essex and his co-workers were able to demonstrate an increase in coronary blood flow with acceleration of heart rate which was clearly not the result of elevation of the mean arterial blood pressure.

A very interesting group of experiments was conducted on trained dogs with the thermostromuhr in place. Thus, the influence of exercise on the coronary blood flow was investigated. These workers demonstrated that successive increases in the rate of work produced additional rises in blood pressure which were approximately proportional to the rate of work for the individual animals in both the control and the experimental groups. In some instances the blood pressure reached its peak early and declined. In some cases it remained near the peak, while in others it continued to rise throughout the entire period of exercise. The great variations which occurred in coronary blood flow could not be satisfactorily explained by changes in blood pressure alone and these investigators concluded that changes in pulse rate with exercise were usually a better criterion of changes in coronary blood flow than were the changes in arterial blood pressure.

In another series of experiments under the same conditions these investigators studied the influence of various drugs on the coronary blood flow. They concluded that changes in the blood flow in the right and left coronary arteries of the trained dog responded in the same qualitative manner to the drugs administered. Drugs known to lower arterial blood pressure, such as theo-

CORONARY DISEASE—WILLIUS

phylline ethylenediamine (aminophylline), histamine, muscle adenosine phosphoric acid (M. A. P.), acetyl-beta-methylcholine chloride (mecholyl), glyceryl trinitrate and papaverine, when administered in proper doses, caused a marked increase in the coronary blood flow, as much as 200 to 300 per cent in certain instances. With only two exceptions, the action of these drugs, when given intravenously, was of short duration. Anesthesia with pentobarbital sodium (nembutal) in one instance resulted in a prolonged augmentation of coronary blood flow.

Drugs which customarily raise arterial blood pressure, such as pitressin, decreased the coronary blood flow as much as 80 per cent and reduced the heart rate. Atropine increased the coronary blood flow as much as 86 per cent and accelerated the cardiac rate, but had little effect on the arterial blood pressure.

Essex, in collaboration with Herrick and Visscher, investigated the action of certain glucosides of digitalis lanata on the coronary blood flow and blood pressure in the trained dog. The glucosides were injected in doses smaller than those capable of producing retching and vomiting. The mean blood flow in the circumflex branch of the coronary artery was measured. In thirteen experiments, with the doses employed, the digilanids A, B, and C, and no effect on the mean coronary blood flow.

Visscher and his associates in their experimental studies reemphasized the importance of pressure gradients in the control of coronary blood flow. They showed that the greater the differences in pressure between the aorta and the pulmonary artery, the greater is the thebesian flow, while the coronary sinus flow is reduced. When the aorta-pulmonary artery pressure head is less than 60 mm. of mercury, the thebesian flow subsides greatly. The higher the aorta-coronary sinus pressure difference, the greater will be the coronary sinus flow.

Katz and his co-workers studied the distribution of the coronary blood flow and made important observations regarding the drainage mechanism of the venous blood. They showed that an average of 92 per cent of the blood from the right circumflex artery drains into the right thebesian system, while the coronary sinus receives an average of only 1 per cent and the left thebesian system an average of 7 per cent of the blood. In the case of the left circumflex artery,

the right thebesian system drains an average of 48 per cent of the blood, the coronary sinus, an average of 38 per cent, and the left thebesian system, 14 per cent of the blood. The anterior descending branch of the left coronary artery drains an average of 51 per cent of its blood into the right thebesian system, an average of 42 per cent by way of the coronary sinus, and an average of 7 per cent into the left thebesian system. These studies clearly showed the importance of the right thebesian system as a drainage bed, even of the blood from the arteries of the left side of the heart. Thus, approximately as much as two-thirds of the total blood flowing through these three important arteries drains into the right thebesian system and less than a third into the coronary sinus.

Other important contributions include those of Wiggers,^{74,75} Fowler, Hurevitz and Smith, Gunn, Gruber and Kountz, and others too numerous to mention.

Pathology of Coronary Disease

Numerous notable contributions dealing with the pathology of coronary disease have appeared in the medical literature of the last quarter century. Outstanding among these studies have been those dealing with both sudden and gradual closure of coronary arteries. The pathologist as well as the clinician has developed an entirely new philosophy regarding the myocardial response to coronary occlusion. In 1918, only six years after Herrick's monumental article, "Clinical Features of Sudden Obstruction of the Coronary Arteries," the medical profession gradually developed a clinical consciousness of this condition, and the occasional diagnosis of that era has been transformed into the routine diagnosis of today.

Considerable interest has been evidenced and numerous investigations have been undertaken dealing with the causes of coronary atherosclerosis. The work of Leary has been especially interesting. This investigator in 1934, after detailed microscopic study in a reasonably large series of cases of coronary atherosclerosis, suggested that the changes could no longer be considered as results of an aging process but, rather, that they represent a disturbance in the lipid metabolism of the body, and that atherosclerosis belongs to the class of metabolic diseases, such as diabetes mellitus, obesity and gout. Although Leary's hypothesis has not been definitely proved, it has given the profession ample food for thought and

has opened the way for other investigations in this field. The plasma lipoid studies of Barker on obliterative atherosclerotic disease of the extremities and my studies^{80,81} on coronary disease have shown the existence of hyperlipemia in many cases. Montgomery and Osterberg called attention to the frequent coexistence of xanthomatosis with hyperlipemia and coronary disease.

White and Patmos, of the Mayo Foundation, conducted a careful histopathologic study of the healing of cardiac infarction. This investigation was of extreme clinical importance because it offered a measurement that enabled the clinician to determine more accurately the length of time required for complete rest of the patients in bed. Infarcts which had been present for from a few hours to several years were studied. This work, unfortunately was never published, but I have repeatedly referred to it in the literature and have accorded full credit to these workers.

They found that when death occurred within two to four hours after coronary occlusion, regions of focal degeneration were present in muscle bundles of apparently normal appearance. In the muscle bundles, however, regions of early necrosis, cloudiness, pyknosis of nuclei and diminution of the transverse striations were demonstrable and there were slight interstitial edema and congestion of the blood vessels. Infarcts of from four hours to five days old exhibited complete necrosis and acute inflammation. The necrotic regions were found to coalesce, and numerous polymorphonuclear leukocytes were seen around the edges. A few lymphocytes, mononuclear leukocytes and extravasated erythrocytes were visible. In infarcts which were two days old, phagocytosis was well under way.

The amount of fat in the necrotic and degenerated muscle cells was found to be increased and karyorrhexis and karyolysis of muscle bundles were marked. Cellular changes, ranging from hyaline to granular degeneration, occurred. Fibroblasts were observed occasionally at the margins of the necrotic portions of the infarcts which were thirty-six hours old, but they were not plentiful except in infarcts five days old. Infarcts from five to twenty-two days old and even older gave evidence of rapid disappearance of the inflammatory reaction and gradual replacement by connective tissue. After twenty-two days, regions of diffuse fibrosis were present. In infarcts which were from four to six months old, con-

densations and contraction of the fibrous scar were present, representing complete healing.

In a later publication, similar conclusions were reached by Mallory, White and Salcedo-Salgar.

In 1932, Bartels and Smith demonstrated the occurrence of gross cardiac hypertrophy in the presence of healed myocardial infarction, particularly when multiple infarcts had occurred. Subsequent clinical and pathologic correlations have irrefutably supported this contention in spite of the opposition of certain pathologists who persist in their conviction that such hearts have been subjected to the influences of hypertension in spite of completely contradictory evidence.

The same year interest became focused not only on the presence of cardiac infarction but also on the localization of the infarct. Barnes and Ball reported their findings of the incidence and situation of myocardial infarcts in 1,000 consecutive postmortem examinations.

The studies of Blumgart, Schlesinger¹⁵⁻¹⁷ and their associates dealing with collateral circulation have been outstanding and the importance of the method of repair has been well emphasized. They showed that anastomotic communications of less than 40 microns in diameter between various coronary arteries exist in the normal heart, but apparently play only a potential role in the prevention of the sudden and perhaps serious effects of coronary narrowing or occlusion. When marked narrowing or occlusion of coronary arterial tributaries takes place, collateral circulation tends to occur and intercommunicating vessels of up to 200 microns in diameter may be found. Such collateral circulation is capable of compensating for the reduced vascularity resulting from atherosclerotic narrowing or actual occlusion of main coronary arteries, so that the blood supply of the heart remains relatively adequate for a restricted manner of life. Death occurs whenever a sufficiently large portion of the myocardium undergoes ischemia, with or without necrosis, or when other fatal circumstances intervene, such as profound disturbances in rhythm (asystole or ventricular fibrillation) or congestive heart failure. The serious consequences of coronary insufficiency occur when imbalance exists between the nutritional requirements of heart muscle and the factors which permit adequate nutrition to occur.

Paterson and also Nelson have emphasized the role of intimal hemorrhage in producing coronary

ary thrombosis. Hemorrhage from sinusoidal blood vessels which are found near atheromatous plaques is not uncommon. Hemorrhagic lesions of the coronary arteries have recently been studied and reported by English and me.

Diagnosis of Coronary Disease

The era of twenty-five years ago found the medical profession confused regarding the recognition and identification of diseases of the myocardium. A short time previously, the teaching of cardiology had been centered on cardiac murmurs and the minutia of auscultatory findings had obscured the greater issue of clinicopathologic correlations. The universal employment of the term "chronic myocarditis" seemed self-sufficient and countless diagnoses were tossed into this rather meaningless category. Gradually it became evident that specific types of cardiac disease belonged in specific categories and thus physicians found an ever-decreasing incidence of so-called chronic myocarditis and an ever-increasing incidence of coronary disease, hypertensive heart disease and the co-existence of both.

As already stated, Herrick's article on sudden coronary obstruction kindled medical consciousness to this important condition which for many reasons has been destined to become the formidable problem that it is today. Up to this time the diagnosis of angina pectoris included many instances of coronary obstruction. Gradually, the medical literature became charged with an ever-increasing number of splendid articles calling attention to the typical as well as the atypical clinical manifestations of the condition and separating the phenomena from those of the anginal syndrome of coronary atherosclerosis. Among these articles were those of Christian, White and his associates,²⁸ Gibson, Hamman, and many others.^{19,35,40,41,43-48,50,51,62,64,67,84}

Electrocardiography in Coronary Disease

Notable advances have been made in the science of electrocardiography during the last twenty-five years particularly with regard to the correlation of electrocardiographic abnormalities with clinical and postmortem findings.

Although some of the pioneer studies of electrocardiography in coronary disease require modification in view of present-day knowledge, nevertheless they marked significant advances in the evolution of this field. Among them were the studies of F. M. Smith⁵⁹ and Willius.^{76,77}

In 1920 Pardee⁵⁵ accurately described the cove type of T wave change in acute obstruction of the coronary artery and this report did much to stimulate other investigators to amplify the understanding of other changes in the graphic configuration. Parkinson and Bedford's splendid study appeared in 1928 and paved the way for subsequent investigations dealing with the electrocardiographic criteria for the localization of infarcts. These authors showed that the changes in the RS-T segments could be placed in two groups, the T₁ and the T₃.

A year later, Barnes and Whitten demonstrated that it was possible to localize the region of infarction in the left ventricle when certain electrocardiographic alterations were recorded. The T₁ type of electrocardiogram indicated infarction of the anterior surface of the left ventricle, whereas the T₃ type indicated infarction of the posterior basal portion of the left ventricle.

Wilson and his co-workers and Barnes^{10,11} also showed the significance of certain changes in the initial deflections of the ventricular complexes in relation to acute myocardial infarction. The Q₁ pattern was found to be associated with acute or healing acute infarction in the anterior and apical portion of the left ventricle and the adjacent interventricular septum while the Q₃ pattern was found to occur with acute or healing acute infarctions in the posterior basal portion of the left ventricle and adjacent interventricular septum.

In 1934,⁷⁸ I published the electrocardiographic findings in 2,000 cases of coronary sclerosis with the anginal syndrome. Normal records were obtained in 34 per cent of the cases while the remaining patients displayed one or more significant abnormalities such as T wave negativity, conduction defects, auricular fibrillation and flutter and lengthened Q wave in lead III. The total group comprised patients with and without hypertension and healed cardiac infarction.

This era also witnessed the introduction of multiple thoracic leads. In 1932 Wolferth and Wood^{83,84} placed electrodes directly on the anterior and posterior surfaces of the thorax and by their manner of placement recorded the fourth lead directionally opposite to the conventional first lead. This method was quite universally employed until attempts at standardization were made by the Committee⁸¹ for the Standardization of Precordial Leads of the American Heart Association. Differences in the resultant electrocar-

diograms occur when slight differences in the placement of the electrode occur so that the method is fraught with dangers by those not fully aware of the possible technical variations. This phase of the science of electrocardiography can only be mentioned here as a distinct forward step—detailing it would be a study unto itself.

A word of warning here may not be inappropriate. While the science of electrocardiography has made remarkable progress in the last quarter century its more extended use by the medical profession has permitted the development of certain evils. Electrocardiography, like other diagnostic methods, is basically a clinical adjunct and must remain in this order of importance to ensure its perpetuity. Physicians superficially trained in electrocardiography have the inclination to infer clinical diagnoses from the electrocardiogram alone, a procedure which can never be tolerated. They look upon the graphic registration as an all-revealing method which permits them to simplify their diagnostic scheme by according the same interpretation and significance to certain minutia regardless of the cause of the cardiopathy, the state of function of the heart, the physical findings, and so forth. Such destructive influences must be removed in order to preserve the gains which have been accumulated.

Prognosis in Coronary Disease

With the passage of the years and the accumulation of medical experience based on a remarkably improved diagnostic philosophy, the profession has greatly altered its concept regarding the prognosis of coronary disease. This is particularly true regarding sudden obstruction of a coronary artery with acute infarction of the myocardium. Twenty-five years ago it was quite generally believed that the majority of the patients succumbed immediately or soon after the attack.

Gradually studies appeared and indicated that not all patients with coronary thrombosis were destined to die but that many recoveries ensued and even some patients recovered sufficiently to participate actively in life. Among these studies were those of White,⁷⁰ Pardee,⁵⁸ Ernstene, Levy,⁴⁶ Willius and others.⁷⁹

Treatment of Coronary Disease

While countless suggestions have been forthcoming regarding the treatment of coronary disease this chapter still woefully falls short of its mark. Nevertheless, the better understanding of

coronary disease in general has permitted the profession to accomplish much in the application of nonspecific measures. I refer particularly to the fuller realization of the necessity and importance of instituting individualized regimens which can be very comprehensive in scope and when adhered to may remarkably safeguard and prolong the life of the individual patient. Therapeutic suggestions, both medicinal and surgical, have been so numerous that space forbids their detailed discussion or bibliographic reference so that only some of them will be mentioned.

The beginning of this last quarter century still witnessed the employment of cervical sympathectomy and its various modifications as well as paravertebral injection of procaine hydrochloride and absolute alcohol. These procedures have gradually but hopefully lost their appeal. Then came the xanthine drugs (vasodilators) such as theobromine, theophyllin, theosin, theobromine-sodio-salicylate, aminophylline, and so forth. These drugs, while apparently beneficial in a certain percentage of cases, fall far short of a therapeutic success. This was followed by the startling advocacy of total thyroidectomy for the control of coronary disease and congestive heart failure from other causes. The procedure was based on the premise that the resulting drop in the basal metabolic processes of the body would result in reduced cardiac demands and work. Its proponents soon lost their enthusiasm and the method has now been generally abandoned.

Various operations were then advocated attempting to bring about new circulation to the heart by the transplantation of muscle flaps, omentum, and so forth. More recently, the introduction of talc into the pericardium with the intention of causing adhesions between the visceral and parietal pericardium and thereby increasing the circulation of the heart has been advocated. These procedures, while interesting and ingenious, are obviously still in their experimental phase and must be received with caution.

Other suggestions comprise the intramuscular injection of a tissue extract, radiation of the suprarenal glands and inhalation of trichloroethylene.

References

1. Anrep, G. V.: The regulation of the coronary circulation. *Physiol. Rev.* 6:596-629, (Oct.) 1926.
2. Anrep, G. V.: Lane medical lectures; studies in cardiovascular regulation. 118 pp. Stanford University, California; Stanford University Press, 1936.
3. Anrep, G. V., and Bulatao, E.: Observations on the pulmonary circulation. Pulmonary circulation in the heart-lung preparation. *Jour. Physiol.* 60:175-192, (July) 1925.

CORONARY DISEASE—WILLIUS

4. Anrep, G. V., and Häusler, H.: The coronary circulation. I. The effect of changes of the blood-pressure and of the output of the heart. *Jour. Physiol.*, 65:357-373, (Aug.) 1928.
5. Anrep, G. V., and Segall, H. N.: The regulation of the coronary circulation. *Heart*, 13:239-260, (Sept.) 1926.
6. Anrep, G. V., and Stacey, R. S.: Comparative effect of various drugs upon the coronary circulation. *Jour. Physiol.*, 64:187-192, (Nov.) 1927.
7. Anrep, G. V., Blalock, A., and Hammouda, M.: The distribution of the blood in the coronary blood vessels. *Jour. Physiol.*, 67:87-96, (Feb.) 1929.
8. Baldes, E. J., and Herrick, J. F.: A thermostrommuhr with direct current heater. *Proc. Soc. Exper. Biol. and Med.*, 37:432-435, (Dec.) 1937.
9. Barker, N. W.: The plasma lipoids in arteriosclerosis obliterations. *Ann. Int. Med.*, 13:685-692, (Oct.) 1939.
10. Barnes, A. R.: Correlation of initial deflections of ventricular complex with situation of acute myocardial infarction. *Am. Heart Jour.*, 9:728-733, (Aug.) 1934.
11. Barnes, A. R.: Electrocardiographic patterns; their diagnostic and clinical significance. 197 pp. Springfield, Illinois: C. C. Thomas, 1940.
12. Barnes, A. R., and Ball, R. G.: The incidence and situation of myocardial infarction in one thousand consecutive postmortem examinations. *Am. Jour. Med. Sci.*, 183:215-225, (Feb.) 1932.
13. Barnes, A. R., and Whitten, M. B.: Study of the R-T interval in myocardial infarction. *Am. Heart Jour.*, 5:142-171, (Dec.) 1929.
14. Bartels, E. C., and Smith, H. L.: Gross cardiac hypertrophy in myocardial infarction. *Am. Jour. Med. Sci.*, 184:452-455, (Oct.) 1932.
15. Blumgart, H. L., Schlesinger, M. J., and Davis, David: Studies on the relation of the clinical manifestations of angina pectoris, coronary thrombosis, and myocardial infarction to the pathologic findings; with particular reference to the significance of the collateral circulation. *Am. Heart Jour.*, 19:1-91, (Jan.) 1940.
16. Blumgart, H. L., Schlesinger, M. J., and Zoll, P. M.: Cardiac pectoris, coronary failure and acute myocardial infarction; the role of coronary occlusions and collateral circulation. *Jour. A.M.A.*, 116:91-97, (Jan. 11) 1941.
17. Blumgart, H. L., Schlesinger, M. J., and Zoll, P. M.: Multiple fresh coronary occlusions in patients with antecedent shock. *Arch. Int. Med.*, 68:181-198, (Aug.) 1941.
18. Christian, H. A.: Cardiac infarction (coronary thrombosis); an easily diagnosable condition. *Am. Heart Jour.*, 1:129-137, (Dec.) 1925.
19. East, C. F. T., Bain, C. W. C., and Cary, F. L.: Cardiac infarction without pain in a series of eight cases. *Lancet*, 2:60-63, (July 14) 1928.
20. English, J. P., and Willius, F. A.: Unpublished data.
21. Ernstene, A. C.: Observations on coronary thrombosis; with a report of three recovered cases. *Am. Jour. Med. Sci.*, 178:383-390, (Sept.) 1929.
22. Essex, H. E.: The coronary blood flow of the trained dog. Pub. No. 13. Am. Assoc. Advancement Sci., pp. 73-80, 1940.
23. Essex, H. E., Herrick, J. F., and Visscher, M. B.: Influence of certain glycosides of digitalis lanata on the coronary blood flow and blood pressure in the trained dog. *Am. Heart Jour.*, 16:143-148, (Aug.) 1938.
24. Essex, H. E., Herrick, J. F., Baldes, E. J., and Mann, F. C.: Blood flow in the circumflex branch of the left coronary artery of the intact dog. *Am. Jour. Physiol.*, 117:271-279, (Oct.) 1936.
25. Essex, H. E., Herrick, J. F., Baldes, E. J., and Mann, F. C.: Digitalis and coronary blood flow. *Proc. Soc. Exper. Biol. and Med.*, 38:325-328, (Apr.) 1938.
26. Essex, H. E., Herrick, J. F., Baldes, E. J., and Mann, F. C.: Influence of exercise on blood pressure, pulse rate and coronary blood flow of the dog. *Am. Jour. Physiol.*, 125:614-623, (Mar.) 1939.
27. Essex, H. E., Wegria, R. G. E., Herrick, J. F., and Mann, F. C.: The effect of certain drugs on the coronary blood flow of the trained dog. *Am. Heart Jour.*, 19:554-565, (May) 1940.
28. Faulkner, J. M., Marble, H. C., and White, P. D.: The differential diagnosis of coronary occlusion and of cholelithiasis. *Jour. A.M.A.*, 83:2080-2082, (Dec. 27) 1924.
29. Fowler, W. M., Hurevitz, H. M., and Smith, F. M.: Effect of theophylline ethylene-diamine on experimentally induced cardiac infarction in the dog. *Arch. Int. Med.*, 56:1242-1249, (Dec.) 1935.
30. Gibson, A. G.: The clinical aspects of ischemic necrosis of the heart muscle. *Lancet*, 2:1270-1275, (Dec. 19) 1925.
31. Gross, Louis: The blood supply to the heart in its anatomical and clinical aspects. New York: Paul B. Hoeber, 171 pp. 1921.
32. Gruber, C. M., and Kountz, W. B.: Some observations on the effect of pitressin upon the cardiovascular system. *Jour. Pharmacol. and Exper. Therap.*, 39:435-447, (Aug.) 1930.
33. Gunn, J. A.: The action of histamine on the heart and coronary vessels. *Jour. Pharmacol. and Exper. Therap.*, 29:325-337, 1926.
34. Hamman, Louis: The symptoms of coronary occlusion. *Bull. Johns Hopkins Hosp.*, 38:273-319, 1926.
35. Hardi, L. L.: Coronary thrombosis simulating perforated peptic ulcer. *Jour. A.M.A.*, 82:692-695, (Mar. 1) 1924.
36. Hausner, Erich, Essex, H. E., Herrick, J. F., and Baldes, E. J.: Control of coronary blood flow in the heart-lung preparation. *Am. Jour. Physiol.*, 131:43-54, (Nov.) 1940.
37. Herrick, J. B.: Clinical features of sudden obstruction of the coronary arteries. *Jour. A.M.A.*, 59:2015-2020, (Dec.) 1912.
38. Herrick, J. F., Essex, H. E., Mann, F. C., and Baldes, E. J.: The effect of digestion on the blood flow in certain blood vessels of the dog. *Am. Jour. Physiol.*, 108:621-628, (June) 1934.
39. Katz, L. N., Jochim, K., and Weinstein, W.: The distribution of the coronary blood flow. *Am. Jour. Physiol.*, 122:252-261, (Apr.) 1938.
40. Kerr, W. J., Larkey, S. V., and Larsen, A. E.: Coronary occlusion and myocardial degenerations; some clinical and pathological considerations. *California and West. Med.*, 23:46-51, (Jan.) 1925.
41. Klionsky, Georges: A case of ischemic necrosis of the heart muscle showing evidence of embolism elsewhere. *Lancet*, 1:74, (Jan. 9) 1926.
42. Leary, Timothy: Pathology of coronary sclerosis. *Am. Heart Jour.*, 10:328-337, (Feb.) 1935.
43. Leary, T., and Wearn, J. T.: Two cases of complete occlusion of both coronary orifices. *Am. Heart Jour.*, 5:412-423, (Apr.) 1930.
44. Levine, S. A.: Coronary thrombosis; its various clinical features. *Medicine*, 8:245-418, (Sept.) 1929.
45. Levine, S. A., and Tranter, C. L.: Infarction of the heart simulating acute surgical abdominal conditions. *Am. Jour. Med. Sci.*, 155:57-66, (Jan.) 1918.
46. Levy, R. L.: Mild forms of coronary thrombosis. *Arch. Int. Med.*, 47:1-18, (Jan.) 1931.
47. Libman, E., and Sacks, B.: A case illustrating the leukocytosis of progressive myocardial necrosis following coronary artery thrombosis. *Am. Heart Jour.*, 2:321-326, (Feb.) 1927.
48. Longcope, W. T.: The effect of occlusion of the coronary arteries on the heart's action and its relationship to angina pectoris. *Wisconsin Med. Jour.*, 20:449-453, (Feb.) 1922.
49. Mallory, G. K., White, P. D., and Salcedo-Salgar, Jorge: The speed of healing of myocardial infarction. A study of the pathologic anatomy in seventy-two cases. *Am. Heart Jour.*, 18:647-671, (Dec.) 1939.
50. McNee, J. W.: The clinical syndrome of thrombosis of the coronary arteries. *Quart. Jour. Med.*, 19:44-52, (Oct.) 1925.
51. Moe, G. K., and Visscher, M. B.: The mechanism of failure in the completely isolated mammalian heart. *Am. Jour. Physiol.*, 125:461-473, (Mar.) 1939.
52. Montgomery, Hamilton and Osterberg, A. E.: Xanthomatosis. Correlation of clinical, histopathologic and chemical studies of cutaneous xanthoma. *Arch. Dermat. and Syph.*, 37:373-402, (Mar.) 1938.
53. Nelson, M. G.: Intimal coronary artery hemorrhage as a factor in the causation of coronary occlusion. *Jour. Path. and Bact.*, 53:105-116, (July) 1941.
54. Oberhelman, H. A., and LeCount, E. R.: Variations in the anastomosis of the coronary arteries and their sequences. *Jour. A.M.A.*, 82:1321-1325, (April 26) 1924.
55. Pardee, H. E. B.: An electrocardiographic sign of coronary artery obstruction. *Arch. Int. Med.*, 26:244-258, (Aug.) 1920.
56. Pardee, H. E. B.: Complete clinical recovery after thrombosis of a coronary branch. *Am. Heart Jour.*, 2:442-445, (Apr.) 1927.
57. Parkinson, John and Bedford, D. E.: Successive changes in the electrocardiogram after cardiac infarction (coronary thrombosis). *Heart*, 14:195-239, (Aug.) 1928.
58. Paterson, J. C.: Some factors in the causation of intimal hemorrhages and in the precipitation of coronary thrombi. *Canad. Med. Assoc. Jour.*, 44:114-123, (Feb.) 1941.
59. Smith, F. M.: The ligation of the coronary arteries with electrocardiographic study. *Arch. Int. Med.*, 22:8-27, (July) 1918.
60. Smith, F. M.: Concerning the anatomy of the coronary arteries. *Am. Jour. Med. Sci.*, 516:706-711, (Nov.) 1918.
61. Standardization of precordial leads. *Am. Heart Jour.*, 15:107-108, (Jan.) 235-239, (Feb.) 1938.
62. Sutton, D. C.: The effects of temporary occlusion of the coronary arteries. *Jour. Clin. Investigation*, 7:305, (June) 1929.
63. Visscher, M. B.: The restriction of the coronary flow as a general factor in heart failure. *Jour. A.M.A.*, 113:987-990, (Sept. 9) 1939.
64. Wearn, J. T.: Thrombosis of the coronary arteries with infarction of the heart. *Am. Jour. Med. Sci.*, 165:250-276, (Feb.) 1923.
65. Wearn, J. T.: The extent of the capillary bed of the heart. *Jour. Exper. Med.*, 47:273-292, (Feb.) 1928.
66. Wearn, J. T.: The rôle of the Thebesian vessels in the circulation of the heart. *Jour. Exper. Med.*, 47:293-316, (Feb.) 1928.
67. Wedd, A. M.: Painless coronary occlusion. *New York State Jour. Med.*, 28:1091-1095, (Sept. 15) 1928.
68. Wegria, R. G. E., Essex, H. E., Herrick, J. F., and Mann, F. C.: Simultaneous observations on the blood flow of both right and left coronary arteries of anesthetized dogs—effect of drugs. *Am. Jour. Physiol.*, 126:P651, (July) 1939.
69. White, J. H., and Patmos, M.: Unpublished data.
70. White, P. D.: The prognosis of angina pectoris and of coronary thrombosis. *Jour. A.M.A.*, 87:1525-1530, (Nov. 6) 1926.
71. Whitten, M. B.: A review of the technical methods of demonstrating the circulation of the heart. A modification of the celluloid and corrosion technic. *Arch. Int. Med.*, 42:846-864, (Dec.) 1928.
72. Whitten, M. B.: A comparison of the blood supply of the right and left ventricles in childhood. *Arch. Int. Med.*, 45:46-58, (Jan.) 1930.
73. Whitten, M. B.: The relation of the distribution and structure of the coronary arteries to myocardial infarction. *Arch. Int. Med.*, 45:383-400, (Mar.) 1930.

NEUROPSYCHIATRY—HAMMES

74. Wiggers, C. J.: In Levy, R. L.: Diseases of the coronary arteries and cardiac pain, pp. 61-68. New York: The Macmillan Company, 1936.

75. Wiggers, C. J. and Cotton, F. S.: Studies on the coronary circulation. II. The systolic and diastolic flow through the coronary vessels. *Am. Jour. Physiol.*, 106:597-610, (Dec.) 1933.

76. Willius, F. A.: Observations on negativity of the final ventricular T wave of the electrocardiogram. *Am. Jour. Med. Sci.*, 160:844-865, (Dec.) 1920.

77. Willius, F. A.: Anomalous ectopic. An electrocardiographic study. *Arch. Int. Med.*, 27:192-223, (Feb.) 1921.

78. Willius, F. A.: Electrocardiography as a diagnostic adjunct in the animal syndrome of coronary sclerosis. *Proc. Twenty-fourth Ann. Meeting, American Life Convention*, 1934.

79. Willius, F. A.: Life expectancy in coronary thrombosis. *Jour. A.M.A.*, 106:1890-1894, (May 30) 1936.

80. Willius, F. A.: Cardiac clinics LXV. A talk on the sex discrepancy in coronary disease. *Proc. Staff Meet., Mayo Clin.*, 14:751-752, (Nov. 22) 1939.

81. Willius, F. A.: Coronary disease and life insurance. *Proc. Assn. Life Insur. Med. Dir. America* (1939), 26:215-236, 1940.

82. Wilson, F. N., Macleod, A. G., Barker, P. S., Johnston, F. D., and Kolstermeyer, L. L.: The electrocardiogram in myocardial infarction with particular reference to the initial deflections of the ventricular complex. *Heart*, 16:155-199, (June) 1933.

83. Wolfert, C. C., and Wood, F. C.: The electrocardiographic diagnosis of coronary occlusion by the use of chest leads. *Am. Jour. Med. Sci.*, 183:30-35, (Jan.) 1932.

84. Wolfert, C. C., and Wood, F. C.: Further observations upon the use of the chest leads in the electrocardiographic study of coronary occlusion. *Med. Clin. N. A.*, 16:161-167, (July) 1932.

85. Wolff, Louis, and White, P. D.: Acute coronary occlusion: report of twenty-three autopsied cases. *Boston Med. and Surg. Jour.*, 195:13-25, (July 1) 1926.

NEUROPSYCHIATRY THEN AND NOW

E. M. HAMMES, M.D.

Saint Paul, Minnesota

MINNESOTA MEDICINE was born and christened during the first World War, and is celebrating its Silver Anniversary in the midst of the second World War.

The progress that MINNESOTA MEDICINE has made during this period in its scientific contributions, in its volume of publications and in its continued high ethical standards should be a great source of pride to every member of our State Medical Association. MINNESOTA MEDICINE has been fortunate throughout these years in having as its editors men of unusual professional skill and untiring energy. The editing and publishing committee wants to take this opportunity to express their appreciation to these editors, who have in a large measure been responsible for making MINNESOTA MEDICINE one of the outstanding state medical journals of this country.

During this period, neuropsychiatry, including neurosurgery, has made remarkable progress. The diagnosis and treatment of the various neuropsychiatric disorders has been placed on a higher and more scientific plane than ever before. A more thorough undergraduate training in every field of medicine, including that in neuropsychiatry, has emphasized to the medical profession as a whole the importance of this special field, and has made possible the diagnosis and proper treatment of many of these interesting problems.

The establishment of a psychiatric unit at the University Hospital of the Medical School of the University of Minnesota, in 1937, has given our medical students ample opportunity to ob-

serve the various psychiatric disorders, to diagnose them and to note the effect of proper treatment. Prior to that time, clinics in psychiatry were conducted only at the Ancker Hospital in Saint Paul and the General Hospital in Minneapolis. Invariably the clinical material was limited, and the period for observation confined to that clinic hour. There was no time for further study and for the psychiatric and psychologic treatment of the individual patient. This psychiatric unit has filled a very important place in our medical curriculum and has resulted in great benefit to unfortunate mental patients in the state of Minnesota.

The Child Guidance Clinics, established in the various large centers in this state in 1924, have assisted in solving many of the behavior problems, the child delinquencies, the distressing parent-child relationships and other serious childhood conflicts.

The universal application of the chemical and dynamic studies of the spinal fluid, the better understanding of the various neuropsychiatric syndromes associated with endocrine dysfunction, and the more thorough knowledge of the chemical structure and of the electric potentials of the central nervous system have become important cogs in our diagnostic armamentarium.

The advances made in the field of neurosurgery in intracranial and spinal neoplasms, in operations on the sympathetic nervous system and in the treatment of cerebral injuries surpass every other surgical field, not only in scientific ingenuity but also in therapeutic results.

NEUROPSYCHIATRY—HAMMES

The introduction of lipiodol for the diagnosis of obstructive spinal cord lesions, and the development of the encephalogram and ventriculogram have resulted in earlier and more accurate localization of cord and brain tumors and other obscure cerebrospinal diseases.

The recognition of shock, of the various types of traumatic intracranial hemorrhage and of the depressed fractures in cerebral injuries along with the development of proper treatment, have reduced the mortality rate in this rather frequent accident from 52 per cent to as low as 8 to 12 per cent in some clinics.

During the early era of MINNESOTA MEDICINE, the medical profession passed through a period of the indiscriminate use of the various endocrine extracts. Gradually this was placed on a more scientific and rational basis. Today, twenty-five years later, we are in the midst of a vitamin boom, and the public, our patients, are paying an enormous price for this experiment. Undoubtedly the various vitamins are playing an important role in the development and treatment of certain specific diseases, but their indiscriminate use should be discouraged. It has been quite definitely established that deficiency in vitamin B₁ produces polyneuritis and that lack of vitamin B₂ produces pellagra, not infrequently associated with a psychosis. Experimental studies have further demonstrated degenerative lesions in the central nervous system caused by marked vitamin B₁ deficiency. Similarly, alcoholic polyneuritis is evidently due to a B₁ avitaminosis, and not to any toxic effect of alcohol. Treatment along these lines has produced excellent results.

A rich vitamin diet, with emphasis on nicotinic acid, has resulted in prompt recovery from the cutaneous lesions and also the psychiatric manifestations in pellagra. The early encouraging reports in the treatment of progressive muscular dystrophy with vitamin C and of amyotrophic lateral sclerosis with vitamin E have not been confirmed in later studies, and no definite progress has been made in the therapy of these disabling diseases. Yungblut believes that vitamin C may play a neutralizing role in preventing virus infections of the central nervous system. He bases his opinion on experimental work done on monkeys in whom paralytic doses of poliomyelitis virus mixed with small amounts of crystalline vitamin C were injected intracerebrally. No paralytic symptoms developed.

In the winter of 1917, epidemic encephalitis first became prevalent on the European continent and gradually involved the entire civilized world. The first cases in Minnesota were observed in the early summer of 1919, and within five years over 4,000 patients had suffered from this disabling disease in this state. Since then extensive studies experimentally and clinically have been unable to determine a definite etiologic factor (a virus infection) or to suggest a prophylactic or immunizing measure or to develop a successful therapy. Benzedrine sulfate, stramonium or belladonna may relieve some of the distressing sequelæ.

In acute anterior poliomyelitis, the results have been just as discouraging except that the recent Kenny treatment offers a more hopeful outlook and a greater number of recoveries. With the introduction of sulfanilamide in 1935, and its allied compounds, remarkable therapeutic results have been obtained in some of the pyogenic infections of the central nervous system. The mortality rate in meningococcus meningitis has been reduced from 45.9 per cent to as low as 9 per cent. The serious sequelæ have also been materially lessened. In a mild epidemic in Great Britain, in 1941, the results were even more favorable. Streptococcus and pneumococcus meningitis have shown similar satisfactory results but not to the same extent. The virus infections, however, remain resistant to this treatment.

With the introduction of salvarsan by Ehrlich, in 1910, the treatment of syphilis was placed on a more rational basis, and the tendency for involvement of the nervous system greatly lessened.

In the treatment of parenchymatous syphilis the various forms of salvarsan were largely replaced by tryparsamide, prepared by Jacobs and Heidelberger in 1917. The various forms of fever therapy, particularly the malarial treatment for general paresis instituted by Wagner von Jauregg in 1918, have materially improved our therapeutic results. Hyperpyrexia induced by intravenous injections of triple typhoid or by electricity, has produced favorable results in various neurological disorders, particularly in acute chorea.

Among other therapeutic measures developed during this period are the addition of dilantin in the treatment of epilepsy, the use of ergotamine tartrate or ergonovine in the relief of at-

tacks of migraine, and Fürstenberg's treatment for Ménière's disease, which has produced satisfactory results. Fürstenberg's treatment consists mainly in an absolutely sodium chloride free selected diet, with large doses of ammonium chloride in capsules and some mild sedative. In the more resistant cases surgical section of the auditory nerve has proven successful.

The treatment of narcolepsy with benzedrine sulfate has given satisfactory results in relieving the attacks of uncontrollable sleep. Myotonia congenita, with its inability to contract and relax voluntary muscles, has been greatly benefited by the use of quinine hydrochloride, and the marked muscle fatigability due to myasthenia gravis has been relieved and the tendency to remissions increased by the administration of prostigmin and glycine.

The pioneer work of Berger in developing the electro-encephalograph and the resultant studies in normal and abnormal electric activities of the cerebral cortex have increased our knowledge of and our diagnostic ability in many cerebral disorders. Gibbs and Lennox have demonstrated that epilepsy is a paroxysmal dysrhythmia and that the three main types of epilepsy produce distinct abnormal cerebral rhythms. Electro-encephalography also aids in differentiating organic from functional post-traumatic cerebral conditions, symptomatic from essential types of epilepsy and from hysterical convulsions, and in the localization of cerebral neoplasms.

Surgical measures have finally been devised for the relief of pain in many of the chronic neurological disorders. Local alcohol injection or the radical sensory root resection in trifacial neuralgia have given relief to many intense sufferers. Similar results have been obtained in other prolonged neuralgias by the intraspinal section of the posterior roots. The surgical removal of a protruded intravertebral disc has alleviated the pain and allied symptoms in many cases of sciatica. The epidural or subarachnoid injection of absolute alcohol for the relief of pain in metastatic involvement of the nerve plexuses or the spinal cord is a simple and quite effective procedure. In some cases, however, section of the pathways for pain in the spinal cord, as suggested by Spiller, must be resorted to.

The problem of the care and treatment of the psychoses is still a major one, particularly among the military forces during and after a

World War period. The recent shock treatments with insulin, metrazol and electricity for the functional psychoses have increased the percentage of remissions and have shortened the period of hospitalization. Sufficient time has not elapsed to definitely determine whether these remissions will be of longer duration and whether the relapses will be less frequent than with previous forms of therapy. That is the ultimate criterion.

In World War I, neuropsychiatric disabilities constituted about 30 per cent of the disabilities from which soldiers suffered. The cost to the Government of caring for these men, disabled from this cause during the war, including treatment, disability allowances and pensions, has been to date approximately \$950,000,000, an average of \$30,000 per man so disabled. Many of these men are still confined in Government Hospitals and will be so permanently. It has been estimated that 96 per cent of these disabilities were considered to have arisen *not* in line of duty. In 1927 almost 50 per cent of all patients receiving hospital treatment as beneficiaries of the United States Veterans' Bureau were neuropsychiatric cases.

Neuropsychiatric disabilities in the American Expeditionary Forces became so prevalent that General Pershing, in the spring of 1918, cabled Washington, requesting more careful and thorough neuropsychiatric examination before sending soldiers overseas. In Base Hospital No. 99 A.E.F., where the writer had charge of the neuropsychiatric service, many cases were encountered whose family histories revealed a marked neurotic trait or definite evidence of previous personal emotional or psychiatric instability. Experiences in World War I and previous wars have definitely proven that an individual who succumbs to the ordinary stress of civil life is unable to cope with the strict military discipline, exposures, fatigue and emotional strain of active warfare. Many of these individuals would have been able to carry on quite successfully as useful, self-supporting citizens in civil life. To a much greater extent will this be true in the highly mechanized blitz-krieg of World War II. Military service today demands more emotional stability and intellectual activity than ever before.

In the light of these past experiences, the duties and responsibilities of the neuropsychiatrist in this great conflict are multiple indeed.

ENDOCRINOLOGY—HOFFMAN

Fortunately our country today is equipped with a greater number and more highly trained physicians in this special field. More induction boards are able to have their services. A more thorough understanding of the personality make-up of the individual and better methods of examination will undoubtedly result in an Army more thoroughly equipped psychologically, emotionally and intellectually. This will greatly in-

crease the morale of our Army and should materially lessen our war neuropsychiatric casualties. If the leaders of the United Nations will strive as diligently and diplomatically for a just and lasting peace as our soldiers are fighting for an ultimate victory, MINNESOTA MEDICINE will publish its Golden Anniversary journal among more tranquil and happier surroundings.

ENDOCRINOLOGY IN THE LAST QUARTER OF A CENTURY

MAX. H. HOFFMAN, M.D.

Saint Paul, Minnesota

THE term "internal secretion" was first used by Claude Bernard in 1852. About five years earlier Berthold showed for the first time that a substance produced in one part of the body could act on tissue at a distant point. From the time of these earliest observations until the period under discussion, important contributions to the field were not numerous. Outstanding were the names of Graves, Basedow, Gull, Riverdin, and Kocher, in their contributions to the knowledge of thyroid diseases. Pierre Marie described acromegaly and von Mering and Minkowski produced experimental diabetes mellitus by extirpation of the pancreas. Other individuals of importance were Brown-Squard with his injection of testicular extracts; Gley, whose studies showed a relationship between the removal of the parathyroids and tetany; and the work of Oliver, Schaeffer, and Takamine on the adrenal medullary function.

The above list of names does not at all include all those who made earlier important contributions, but the observations of these men were about all that was familiar to the student of twenty-five years ago. When one realizes that most of what we now know in endocrinology is the result of the investigations of the last twenty-five years, we can easily understand that it is really a new field in medicine. The development that has taken place in endocrinology has not been due to the research efforts of any one group of investigators, but credit must be given principally to the biologist, the physiologist, and the biochemist. Although the contributions by the clinician have been numerous, they have not been as important as those of the other groups. In fact this failure of clinical medicine to keep abreast

with the advancement of the other workers has been quite striking.

The Pituitary Gland

Although Pierre Marie described acromegaly in 1886, and Minkowski in 1887 demonstrated its relationship to tumors of the pituitary gland, nothing was known about the mechanism that produced the characteristic overgrowth of bone and soft tissue. Even as late as 1922, Falta, in discussing the condition, enumerated the various theories advanced to explain the acromegalic changes. He stated it to be his belief, on the basis of clinical studies, that the changes are due to the effect of the pituitary gland on growth, but that there was no experimental evidence to confirm that belief. In 1929, Putnam, Benedict, and Teel produced acromegaly in a dog by the injection of a growth extract secured from the anterior pituitary gland. This work conclusively proved that the pituitary tumor of acromegaly produced an excessive amount of growth hormone.

Recent investigation has shown that the pituitary gland possesses several functions other than growth control. At least six hormones have been extracted in recent years.

In 1926, Ascheim and Zondek, and Philip Smith, working independently, discovered that the anterior pituitary gland has a marked effect on the development of the ovaries in mice and rats. This together with the knowledge that extirpation of the anterior pituitary gland in young animals produces dwarfism and sexual infantilism conclusively demonstrated the part played by the gland in sexual maturation.

This sex stimulating hormone (gonadotropic) was found by Ascheim and Zondek in the urine of pregnant women and forms the basis for the test of pregnancy. The hormone found in pregnancy urine was found to be somewhat different, in its effect, from that secured from the pituitary gland itself, and is now believed to be formed in the chorionic tissue. Although it is believed there are two gonadotropic hormones, a follicle stimulating and a second luteinizing hormone, they have not as yet been separated. The gonadotropins have been rather disappointing in their therapeutic effects, although they have a definite but limited place in endocrine treatment. Recent observations with more potent preparations indicate possibly an increased therapeutic usefulness for these substances.

The anterior lobe of the pituitary gland has been shown to produce several other hormones. These are the thyrotropic hormone, the lactogenic, diabetogenic, adrenotropic, and the parathyrotropic factors of the anterior lobe. The isolation of all of these substances together with the growth and gonadotropic hormones is the result of research in this field beginning about 1925. Although the discovery of these hormones have not as yet greatly improved our attempts at endocrine therapy, they have added immensely to our knowledge of pituitary function and endocrine diagnosis.

In the last twenty-five years only one new syndrome has been ascribed to pituitary gland disorder. The condition described by Cushing in 1932 is now known as "Cushing's syndrome" or "pituitary basophilism." Cushing believed the condition was due to a basophilic tumor of the anterior pituitary lobe. The symptoms characteristic of this condition are very similar to those produced by overactivity of the adrenal cortex, and many clinicians do not agree with Cushing that the disease originates in the pituitary gland.

The Thyroid Gland

There was more known about the thyroid gland twenty-five years ago than of any other gland of internal secretion. No significant advances have been made in the last quarter of a century in regard to medical management and diagnosis of diseases of this organ. When Kendall, in 1915, isolated a crystalline substance from the thyroid colloid which he called "thy-

roxin," it was felt by many that this was not the true thyroid hormone. Recent investigation has not revealed unequivocal evidence that there is any other substance which is responsible for its activity.

An important recent contribution to our understanding of thyroid physiology has been the finding that the anterior lobe of the pituitary gland produces a hormone, or hormones (thyrotropic factor) that affect the thyroid gland. Continuous injections of this hormone in animals can produce exophthalmos and other evidence of Grave's disease. Thus, for the first time, exophthalmic goiter has been produced experimentally. However, antihormones are developed in a relatively short time, and the induced hyperthyroidism regresses.

The significance of the part played by this hormone in clinical exophthalmic goiter cannot as yet be evaluated. It is possible that persistent exophthalmos following subtotal thyroidectomy may be caused by an oversecretion of this hormone.

Parathyroid Glands

Although the parathyroid glands were discovered in 1880, the relationship of the parathyroids to calcium metabolism and tetany was not suspected until 1907, when the pathologist Erdheim noticed that a definite association existed between parathyroid tumors and skeletal decalcification. In 1908 and 1909, MacCallum and Voigtlⁿ conclusively showed that tetany in parathyroidectomized dogs was due to a lower blood calcium. In spite of these observations it was still believed by many that the main function of the parathyroid glands was to detoxify poisons in the body, particularly guanidine.

Definite proof that the function of these glands was to control calcium and phosphorus metabolism and not to detoxify, was available with the isolation of the parathyroid hormone by Hanson in 1924 and Collip in 1925. This hormone is markedly effective in raising the blood level of calcium in hypoparathyroid tetany. Its exact mode of action in altering calcium metabolism is not as yet known.

The anterior lobe of the pituitary gland secretes a hormone (parathyrotropic) that stimulates these glands. It has never been recovered in pure form. No clinical syndrome is attached to alterations of the parathyrotropic hormone al-

though the osteoporotic changes in Cushing's disease are supposed to be due to the overproduction of this hormone.

Considerable advancement has taken place in the treatment of hypoparathyroidism and its attendant hypocalcemia. Although the milder cases can be satisfactorily taken care of with calcium alone, the parathyroid hormone and hytakerol have been very effective in raising the blood calcium in the severe cases. Hytakerol, formerly known as "A.T.10" was first used by Holtz in 1934 and is derived from irradiated sterols. When given orally it has a marked action in raising the blood calcium.

In 1925, Mandl removed a parathyroid tumor in a case of osteitis fibrosa cystica with remarkable results. He first definitely established the relationship between von Recklinghausen's disease of the bones and an overfunctioning tumor of the parathyroid gland. His observations received confirmation from many sources, and much work has been carried out on many phases of hyperparathyroidism since that time.

The Pancreas

Following the observations of von Mering and Minkowski, in 1889, that diabetes resulted when the pancreas was removed from dogs, numerous investigations contributed to the various aspects of this disease. Although twenty-five years ago it was felt that the islands of Langerhans secreted the antidiabetic hormone, no method of extracting this hormone from the pancreas was successful because of the autolytic action of its external secretion. In 1920, Barron made the observation that when the pancreatic duct was obstructed, the cells forming the external secretion degenerated and the island cells were left intact. From this observation Banting and Best, in 1922, were able to extract from the pancreas a substance which when injected into dogs was capable of lowering the blood sugar. This hormone, which was named insulin, revolutionized the treatment of diabetes mellitus. Its use has made it possible for thousands of diabetics to lead comfortable and useful lives. This discovery without question has been one of the most important in medical history.

The mode of action of insulin is not clear in all its details. A much debated point as to whether insulin takes part in the oxidation of carbohydrates is still to be settled. Some of the

actions of this hormone are very clear, such as the part it plays in the formation and deposition of glycogen in the liver.

The relation between the pancreas and the anterior pituitary gland has assumed great importance since Houssay showed that the pituitary gland has a very definite inhibitory action on the production or activity of insulin.

Following Houssay's observations, Young in 1940 produced severe permanent diabetes in dogs and cats by the injection of extract of the anterior pituitary lobe. This type of diabetes simulates in many respects the disease as it occurs in humans. No definite evidence has as yet been found to prove that the diabetes mellitus seen clinically is due to pituitary disturbance. However, the diabetes seen so frequently in association with acromegaly may well be produced by such a mechanism.

The disturbances in fat metabolism associated with diabetes mellitus is not always influenced by the action of insulin. For this reason it is felt by some that the pancreas must secrete another hormone. Dragstad isolated from the pancreas a substance which is called "lipcaiac" that appears to have some action in the mobilization of fat, and, in particular, has an effect in reducing the fat infiltration in the liver in severe diabetes. It has not been very effective according to clinical reports.

The Adrenal Gland

The adrenal is formed by two separate and distinct endocrine organs—the medulla which is not essential to life, and the cortex which is most essential.

The Adrenal Medulla.—Very little advance has been made in our knowledge of the physiology or disturbances of the adrenal medulla in the past twenty-five years. The controversy between Cannon and his followers, and Stewart and Roff, regarding the function and action of the adrenal medulla has never been definitely settled. Cannon's emergency theory that contends the adrenal medulla functions only under conditions of emotional stress and has little or no function at other times has been generally accepted.

The Adrenal Cortex.—In one of the masterpieces of medical literature Thomas Addison in 1855 described the symptom-complex now known as Addison's disease. He noted the association of

this syndrome characteristic of the disease with pathological changes in the adrenal gland. Little of importance has been added since that time, either to the clinical picture or essential pathological disturbances. In recent years we have learned a great deal about the physiology of the adrenal cortex and its abnormal functioning in Addison's disease, and also about the therapeutic management of this condition. All of this has come about in the last fifteen years.

Baumann, Kurland, and Marine showed that the blood of adrenalectomized cats had a low sodium and a high potassium content, and that the administration of sodium prolonged their lives. Later it was shown that individuals with Addison's disease showed the same blood findings, and if the sodium intake was lowered, a critical condition was produced. Thus it was shown that one of the functions of the adrenal gland was to prevent a loss of sodium and water through the kidneys, and to control the excretion of potassium.

These observations have led to important diagnostic and therapeutic advances in the management of adrenal cortical insufficiency. The salt deprivation tests in doubtful cases has considerable value, and the low potassium and high sodium diet is usually very effective in treatment.

The importance of the adrenal cortex in carbohydrate metabolism is now receiving greater appreciation than ever. It is probably the main organ concerned with the conversion of proteins into carbohydrates (neoglucogenesis).

Its antagonism to the action of insulin is demonstrated by the sensitiveness of patients with Addison's disease to the action of insulin.

No single hormone has been isolated from the adrenal cortex that is capable of producing all of its effects. For that reason some believe that this gland produces several hormones, one, for example, which effects the electrolyte metabolism and another which acts on the carbohydrate metabolism. A third hormone also is present which will be discussed later.

The adrenal cortical extracts produced in 1928 by Hartman, Pfiffner, Swingle and others have definite effects on the water, electrolyte and carbohydrate metabolism. These extracts are now available commercially but have limited value because of their low potency and high cost.

One of the numerous substances isolated from the adrenal cortex is desoxycorticosterone. Its

effect is almost entirely on water and electrolyte metabolism. In 1937, Reichstein synthesized this substance and it has proven of immense value in the treatment of Addison's disease. The present trend of investigation indicates the possibility that we may have in the near future a preparation more satisfactory than anything that we now possess.

The Adrenal Genital Syndrome.—In 1910, Alpert noticed the frequent association between general hirsutism and adrenal cortical tumors. This observation has since been noted many times. There is now ample evidence that the adrenal cortex is in some way concerned with sexual development. Its mode of action is not well understood. The masculinizing sex hormone produced by this gland is known as dehydroisoandrosterone and is related chemically to the other androgens such as testosterone and androsterone. Unconfirmed reports indicate that this substance might be the precursor of testosterone and that the transformation takes place in the testis. In conditions of sex reversal changes associated with adrenal tumors very large amounts of this hormone are found in the urine.

The adrenal cortex also produces an estrogen and several cases of feminization in the male have occurred in association with adrenal cortical tumors.

The Gonads

Certainly the earliest endocrinological observations must have been the effects of castration in the male. As was mentioned before, the conclusion of Berthold that the testis produced a secretion capable of altering the cock's comb was the first evidence of hormone activity. Little knowledge was forthcoming regarding sexual development or gonadal physiology until P. E. Smith, in 1926, showed that following hypophysectomy, the gonads atrophied, and that this atrophy could be prevented by implantation of anterior pituitary tissue.

Following these observations a great deal of work by numerous investigators led to the isolation of a pituitary hormone that was effective in stimulating the activity of the gonads. Later it was found that a pituitary-like hormone could be secured from pregnancy urine or from the blood of pregnant mares. This hormone differs in some respects from that secured from the gland itself.

Further research on the relationship between

the gonads and the pituitary gland has established the importance of the pituitary in its effect on normal and abnormal physiology of the gonads. The relationship is reciprocal in nature, the gonadal secretion acting in an inhibitory manner on the production of the gonadotropic hormone. Following the reduction of gonadal activity such as in castration or menopause, there is an over-production of gonadotropins. This is supposed to be responsible for the disturbances that occur in menopause.

The Ovary.—Until recent years our information regarding the normal and abnormal functioning of the ovaries was practically nil. There is much still to be learned, particularly regarding menstrual abnormalities and uterine bleedings of various types, and their relation to ovarian hormone disturbances.

Our present knowledge of the hormones which control menstruation has been acquired in the past ten years. Allen and Doisey in 1922 first showed that a substance could be extracted from the ovary which could establish an estrus cycle in castrated rats. In 1927 Ascheim and Zondek demonstrated this substance in large amounts in the urine of pregnant animals. In 1929 Doisey and Butenandt independently crystallized this hormone and prepared the field for chemical identification of the estrogenic hormones. The estrogen estradiol has been isolated from the follicle, and is presumed to be the active ovarian estrogen. This hormone is capable of producing only the proliferative or first phase of the menstrual changes in the endometrium. The second phase or the secretory stage is brought about by the hormone of the corpus luteum.

The main therapeutic usefulness of the estrogenic hormone has been in the treatment of the menopausal syndrome and in this condition it has been most valuable.

The substance produced by the corpus luteum, which exerts the specific effect on the endometrium, was first extracted in 1929. In 1934 several investigators simultaneously produced it

in a pure form and revealed its chemical structure. It is now produced synthetically and known as "progesterone." It has been used with some success in habitual and threatened abortion and also in various types of uterine bleeding.

The two hormones, estrogen and progesterone, when used in adequate amounts at the proper interval, can produce in the uterus the entire menstrual cycle.

The Testis.—McGee, in 1927, extracted from the bull's testis a substance with comb growth properties. In 1931 Butenandt succeeded in preparing in a crystalline form the male sex hormone from human urine. Previous to that time numerous unsuccessful attempts were made to prepare an active male sex hormone. Later, in 1934, Laquer isolated the same hormone from the testis itself. This hormone has been given the name "testosterone." Whether this is the only hormone produced by the testis is still open to question. As yet, however, no other has been found. Several other substances with androgenic action but inferior in their potencies to testosterone have been found in the urine and adrenal cortex. However, it is now definite that the testis is the main source, if not the only one, of testosterone.

This hormone now produced synthetically is capable of restoring the secondary sex characters resulting from loss of testicular function. It can bring about sexual maturation in the undeveloped male if given in adequate amounts. The clinical field of usefulness for this preparation is, however, rather limited.

This review of the developments in endocrinology in the last twenty-five years is in no sense a complete compilation of all the work that has gone on in recent years and which is being carried out at this time. Such a task would be enormous. An attempt has been made to mention the most important contributions, but even here the work of many investigators who have added significantly to our knowledge has not been touched upon.

AWARDS ESTABLISHED TO FURTHER RESEARCH ON CELLS

Creation of two new prize awards for research adding to knowledge of factors affecting the growth of cells with particular reference to human cancer is announced by Dr. William J. Robbins, chairman of the National Science Fund of the National Academy of Sciences. The prizes are to be known as the Charles L. Mayer Awards.

"One prize of \$2,000 will be awarded for a contribu-

tion published in 1942 or submitted in manuscript to the National Science Fund," Dr. Robbins stated, "and a similar prize in 1943. The Charles L. Mayer Awards are a new type of award in that they will be given to further the scientific work of the recipient. They are not only rewards for past accomplishments but are also designed to increase the opportunities of those with exceptional abilities to carry on further research."—*Science News Letter*, December 5, 1942.

PREVENTIVE PEDIATRICS IN PRIVATE PRACTICE

E. J. HUENEKENS, M.D.

Minneapolis, Minnesota

A DISCUSSION of the progress of pediatrics in the past quarter century could be developed from several different angles. Many or all of the following samples might well be headlined as leaders in such progress. Stress might be laid on the recent discoveries in the diagnosis of epilepsy (electro-encephalography) or its treatment (dilantin). One might dilate on the newer knowledge of the anemias of the newborn and their treatment. Also we are on the verge of a better understanding of asphyxia neonatorum with a growing concept of the dangers of maternal anesthesia and analgesia to the newborn infant. As another sample we have found that the administration of Vitamin K immediately after birth will control many of the hemorrhagic diseases of the newborn. Again the death rate among premature babies has been dramatically reduced by improved care and feeding and the wise use of air conditioned surroundings. The great advances wrought in the treatment of various acute infections by the sulfonamides might well be considered the most important event of the last twenty-five years. Finally, one might nominate as the outstanding advance in pediatrics today what Powers³ calls supportive therapy. In a paper entitled "Developments in Pediatrics in the Past Quarter Century," he says:

"By supportive therapy I mean procedures which might be termed physiological treatment since they are directed toward correcting physiological disturbances rather than to eliminating causes of disease. I refer particularly to the use of parenteral fluids such as blood, blood serum, and normal salt, special electrolyte, and glucose solutions. Now, as never before, we realize that a baby can tolerate tremendous physical trauma but he cannot endure fluid and salt deficits without exhibiting the train of serious symptoms we associate with the terms dehydration, electrolyte imbalance, and shock."

In the long view, great as these advances are, preventive pediatrics is of even greater importance and will perhaps blaze a path for other branches of medicine to follow. The increase in life expectancy in the last twenty-five years is due, in large part, to the decrease in infant mortality. In Minnesota the infant death rate has fallen from 70.1 in 1915 to 33.3 in 1940. The

drop in the mortality of infants under one month of age (the neonatal period) has remained virtually stationary during that time, while practically all reduction has been from the ages of one to twelve months. Our increasing knowledge of nutrition and other prophylactic measures must be credited with the largest part of this reduction.

Modern medicine is stressing more and more the prevention of disease. Many phases of prevention must be performed by public health agencies, but there remain a large number which can best be conducted by physicians in private practice; though I admit the majority of physicians are not alert in carrying them out. Partly this is due to the neglect of our medical schools in teaching prevention in private practice. The average doctor persists in thinking that the care of the sick is his sole function. I have heard medical men on many occasions scoffing at well-baby care by pediatricians as a "racket." It is common to hear an old-fashioned doctor query, "Why vaccinate against smallpox or inoculate against diphtheria when there is no epidemic?" Several years ago the Community Health Service made a survey of the cases that had been discharged from its clinics because the financial situation of the parents had improved and they were able to pay a private physician for well-baby care. As a result of this survey the organization was forced to conclude that most general practitioners do not appreciate the importance of regular and complete physical examination of the well child. Some of the comments of the mothers were quite illuminating: "My doctor weighed the child only. We feel we cannot afford to pay \$2.00 for weighing the child when we can get that done down at the corner store." "When I took my child for vaccination and inoculation for diphtheria he said to wait until the child reached school age." One mother had to ask the doctor if he did not want her to undress the children. His reply was, "No, they look fine." A very common comment from the doctor is that he was too busy to bother with well children.

I presume that the attitude of medical practitioners all over the country does not differ very much from the samples I have just quoted. Out-

side of the pediatricians and a few internists, prophylaxis, in private practice, is in its infancy. If practicing physicians do not wish to have governmental agencies take over more and more of their work, they must seize the opportunity to do preventive work in their private practice. My purpose is to tell you how this can be done. The value of preventive medicine varies inversely in proportion to the age group, the younger the child the more valuable the prophylactic efforts. It is good pediatric practice to have the infants brought in for an examination and advice once a month for the first ten months of life, then every two or three months until the child is two years of age, twice a year until the child is five, and thereafter for annual visits.

During the first months of life our principal function is to direct the feeding and nutrition of the infant. The baby should be weighed each time and we should expect an average gain of 5 ounces a week for the first six months of life and 4 ounces for the second six months. The mother should be encouraged to nurse her baby. It has become rather fashionable of late years to decry the importance of breast feeding, but while greater advances have been made in artificial feeding, in the great majority of cases there is no food to equal nature's own. After the first three months of life an expert pediatrician can do almost as well with artificial food but it must always be borne in mind that breast feeding, whether expertly directed or not directed at all, is equally good feeding while the value of artificial feeding depends entirely on the expertness of its direction.

The best mortality statistics on breast fed and artificially fed infants are those made by Woodbury⁴ on 22,000 live born infants in eight American cities. His summary is as follows:

"The analysis has shown that artificial feeding, as actually practiced in typical city populations, is associated with a mortality between three and four times as high as the mortality among breast fed infants. This excess mortality is not to be explained by the slight overweighing of the group of artificially fed infants in certain groups characterized by high mortality rates; and it appears in all nationalities and in all earning groups."

If the amount of mother's milk is becoming inadequate it can be increased by nursing the baby oftener, by nursing on both breasts each

time, and above all by completely emptying the breasts after each nursing. This last can be accomplished by employing a hand pump, water or electrical pump, or by teaching the mother manual expression. If, in spite of these efforts, there is insufficient milk, artificial food should be given after each nursing rather than to replace a nursing. When artificial food becomes necessary, simple dilutions of boiled milk with carbohydrate additions, or evaporated milk dilutions may be used. Only in exceptional cases is it necessary to employ more complicated formulae. In the first six months of life the baby requires, on an average, 45 calories for each pound of body weight in twenty-four hours. In terms of both breast milk and cow's milk this means two ounces for each pound of weight.

To prevent scurvy, the baby should be given early one teaspoon of orange juice to be gradually increased to three ounces a day. Antirachitics should be employed from the second week of life. Two teaspoons of a potent cod-liver oil daily is sufficient to prevent rickets in the majority of cases, though with increasing war shortages it may be advantageous to employ concentrated substitutes such as viosterol and oleum percomorphum. The infant should be examined monthly for signs of rickets or anemia; this is especially necessary in prematures. A large proportion of infants exhibit early evidences of a sensitive skin. Such infants should be protected from all external irritants such as woolen under-clothing, cold, soap and hard water. Appropriate lotions and ointments may be used to prevent the appearance of eczema. When eczema persists, it may be necessary to employ an elimination diet. From the fourth to the twelfth month vegetables, cereals, cooked fruits, and egg yolk may be added to the diet, and by the tenth month the infant may be placed on three meals a day.

During the latter half of the first year the infant should be immunized against various diseases. Sauer's pertussis vaccine may be given any time after six months of age. When exposed to whooping cough 10 per cent of infants who have been given this vaccine may contract a mild pertussis as against 75 per cent of those non-immunized. Such results warrant us in advising these immunizations though it must be made clear that the results cannot be guaranteed. The three-dose diphtheria toxoid should be administered at eight months of age to be followed in

four months by the Schick test. Tetanus immunization may be employed for any child but it is of especial benefit to allergic children since they are likely to be more sensitive to horse serum.

Vaccination against smallpox should be performed before the end of the first year. The reactions of the infant to all these procedures is exceedingly mild; much milder than in older children and adults. Typhoid and scarlet fever immunizations may be done later if special circumstances warrant.

From the second to the fifth year infection plays an increasingly important role in the child's life. It has been said that the greatest unsolved problem of pediatrics is how to prevent recurring and chronic upper respiratory infections. Ultra-violet radiation and large doses of Vitamin A have been recommended but they are only mildly effective. So-called "cold" vaccines may be administered but only when all other methods have failed. Our principal weapon remains, the removal of foci of infection. In childhood such foci are limited almost entirely to tonsils, adenoids, and accessory nasal sinuses. The deciduous teeth are frequently a source of local infection but very seldom of focal infection. The question of when to remove tonsils and adenoids and when to invade sinuses has caused more controversy than perhaps any other medical and surgical procedure. The indications for tonsillectomy and adenoidectomy are: (1) obstruction to breathing; (2) repeated or chronic infections of the upper respiratory tract; and (3) infection in remote parts of the body which probably originate from a focus in the nose and throat. Such infections are: otitis media, recurrent or chronic bronchitis, rheumatism, infectious asthma and nephritis.

The relation of focal infection to systemic disease is no more clear cut than in otitis media. Drainage of the maxillary sinuses is the operation of choice for recurring otitis media and even in subacute and chronic otitis media. It has been a surprise to me how frequently drainage of sinuses has relieved a more or less chronic otitis media and made a mastoid operation unnecessary. If there is no emergency involved I always insist on a sinus drainage before a mastoidectomy is permitted. From personal experience over a period of years I recommend this procedure very highly even though it has received little consideration in medical literature. Even if mastoidectomy is necessary after sinus drainage, the removal of foci

of infection will help prevent further mastoid disease, which is quite possible after a mastoidectomy.

The relation of foci of infection to the rheumatic syndrome has been an important controversy for years. Infections of the nose and throat are probably not the true cause of rheumatism but are frequently the immediate exciting cause. When such is the case the tonsils and adenoids should be removed and if this brings no relief, sinus drainage should seriously be considered. Kaiser of Rochester has written many papers to show that tonsillectomy does not prevent rheumatism and probably does little to alleviate it after it has begun. I accept his work as sound but feel that only part of the problem has been attacked because the sinuses have been completely ignored. In Kaiser's work, and in similar statistical studies, the answers are all recorded as definite success or failure. In my experience removal of foci of infection markedly alleviates the rheumatic condition. But in a statistical study such cases are recorded as failures if even mild rheumatic attacks recur. The relation of infection to rheumatism is nowhere more completely demonstrated than in the successful prophylactic use of sulfanilamide in these cases. It would therefore seem logical to supplement such prophylactic therapy by the removal of foci of infection. This is another important field where the sinuses have been largely overlooked as a source of infection.

In recurring bronchitis, chronic bronchitis, and bronchiectasis the sinuses are an important source of infection. It is especially in these cases that allergy must be ruled out and this is not an easy thing to do. The seriousness of chronic bronchitis and early bronchiectasis is so great that the patient should usually be given the benefit of any doubt and the tonsils and adenoids removed but even more important the maxillary sinuses should be drained.

Acute glomerular nephritis in childhood is practically always secondary to an acute infection elsewhere. Fortunately the prognosis is usually good, but in most cases it is sound practice to remove the tonsils and adenoids and if indicated drain the sinuses after the disease has subsided, to prevent recurrence. Occasionally where convalescence is unduly prolonged focal infection removal might be indicated while the disease is still active.

Sinus disease must be considered as a possible

factor in such diverse conditions as certain types of pyuria, which recur only in connection with upper respiratory infection; children who have convulsions with each recurring bout of fever; cases of abdominal pain which simulate appendicitis but which on careful observation can be shown to be due to upper respiratory infection; and in a few cases of asthma where infection is the exciting cause.

The best judge of the indications for a tonsillectomy is not necessarily a nose and throat specialist, but rather the physician who has been seeing the child at regular intervals during his respiratory infections and one who is capable of making a complete physical examination. The expert examination of the nose and throat is of less importance. The sanest views on the tonsil problem are contained in an article on the "Indications for Tonsillectomy" by L. W. Dean.² Among other things he says:

"Rules cannot be made to determine when tonsils should be removed, the good judgment of the physician must decide in each case just what should be done. He must take into consideration the local conditions, the condition of neighboring structures, and the general condition of the patient. The tonsils play a much more important role as a source of infection in children than in adults."

If the removal of the tonsils does not solve the problem there are other foci of infection remaining, most often in the maxillary sinuses. The point I wish to emphasize is that the physician, be he pediatrician or general practitioner, who examines the child regularly and not just when he has acute infections is in a better position to make a sane, sound judgment regarding the removal of focal infection than the experts who see the patient only once or twice and form their opinion solely from the local nose and throat viewpoint.

Finally, periodic examinations must concern themselves with the emotional side of the child's life, which is undoubtedly fully as important to his future happiness as his physical health. I would like to emphasize that the child must be shown enough love by his parents to acquire a feeling of security but not so much love and sympathy that he leans on it too heavily and is afraid to venture into the world where this crutch will be absent. Adler says that such smothering love and overprotection is the principal cause of the inferiority complex. The family physician or pediatrician is in the best position to advise parents

about the emotional side of a child's life because the parents naturally consult him and are accustomed to accepting his advice. Thus he may nip the difficulties in the bud by inducing the parents to change their attitude or when this is impossible, by having the child enter a nursery school. This last may sound formidable, but I would stretch the term nursery school to include private homes where a minimum of four or five pre-school children may get together and have supervised and group play. Difficult social adjustments of the future may be prevented by exposing the child to the "give and take" contact with his equals away from the soft shelter of his own home. As great a psychiatrist as Freud was one of the first to appreciate the value of nursery schools in preventing future emotional imbalance.

The common symptoms of poor appetite, sleeplessness, tantrums and fears rest largely on an emotional basis. By correcting in early life the environmental factors which bring about these comparatively mild neuropathic conditions, we may save the child from the delinquency of adolescence and the so-called nervous breakdowns of adult life. It has been said that the emotional pattern of a child's life has been fixed by the time he is five years of age. If this is true (and it is approximately so) then the pediatrician and the family physician can accomplish more in prophylactic mental hygiene than the psychiatrists and their clinics. The famous German pediatrician Czerny recognized this thirty years ago when he published his book "Der Arzt als Erzieher des Kindes" ("The Physician as a Guide to Bringing up Children").

Of the many books on child psychology on the market I wish to recommend two that are noted for their common sense attitude; Thom's "Everyday Problems of the Everyday Child" and Cameron's "The Nervous Child." Last but not least, every physician who deals with children should read Brennemann's¹ "The Menace of Psychiatry," as instructive and entertaining an article as ever appeared in a medical journal. Books on modern psychology and psychiatry have glutted the market for years; Brennemann in this bit of special pleading takes issue with them on a number of important points and pleads for a return to common sense in our dealings with children.

In conclusion, I hope I have pointed out the possibilities of preventive pediatrics in private practice. The effectiveness of this supervision

CLINICAL PATHOLOGY—SANFORD

will depend on the skill, the knowledge, and the experience of the practitioner. If we physicians do not possess sufficient skill, we must acquire it as one of the necessities of modern medicine.

References

1. Brennemann, J.: Menace of psychiatry. *Am. Jour. Dis. Child.*, 42:376, (Aug.) 1931.
2. Dean, L. W.: Tonsils, their function and indications for their removal. *Jour. A.M.A.*, 103:1044, (Oct. 6) 1934.
3. Powers, Grover F.: Developments in pediatrics in the past quarter century. *Yale Jour. Biol. and Med.*, 12:1-22, (Oct.) 1939.
4. Woodbury, Robert M.: Relation between breast and artificial feeding and infant mortality. *Am. Jour. Hygiene*, 2:668, (Nov.) 1922.

THE DEVELOPMENT OF CLINICAL PATHOLOGY AS A SPECIALTY

ARTHUR H. SANFORD, M.D.

Rochester, Minnesota

DURING the last quarter of a century specialization in medicine has developed in a most remarkable fashion. Among the specialties now recognized is that of clinical pathology. Although a number of laboratory men who would now be considered qualified clinical pathologists were practicing this specialty before 1918 when MINNESOTA MEDICINE came into being, their position in the field was not well established. The specialty as now defined by the American Board of Pathology is that branch of pathology that deals with bacteriology, immunology, biochemistry, parasitology, hematology, and clinical microscopy in relation to the diagnosis, prognosis and treatment of clinical disease. In addition to this, many clinical pathologists include in their daily work the diagnosis of biopsy material or surgical pathology. They may be qualified also as specialists in pathologic anatomy.

In the first volume of MINNESOTA MEDICINE, published in 1918, is a paper on "Absolutely Necessary Microscopic Diagnoses," by W. C. MacCarty, which he read before the meeting of the Minnesota State Medical Association. He emphasized the necessity of adequate training in laboratory fields and that the pathologist should be considered a consultant. Marx White in discussing the paper expressed the belief that the scarcity of whole-time laboratory men was principally and largely due to the inadequate compensation given to such men and the fact that clinicians did not correlate their work with that of laboratory men. This paper is mentioned because of the great impetus to the recognition of clinical pathology as a specialized field that came after the formation of the American Society of

Clinical Pathology three years later in 1921. Dr. MacCarty was the second president of this society and there have been two other presidents from the State of Minnesota, Dr. A. H. Sanford in 1927-1928 and Dr. T. B. Magath in 1938-1939. The president in 1939-1940 was Dr. L. W. Larson of Bismarck, North Dakota, an alumnus of the University of Minnesota, School of Medicine. The objectives of this society are the promotion of the practice of scientific medicine by a wider application of clinical laboratory methods to the diagnosis of disease; the stimulation of original research in all branches of clinical laboratory work; the establishment from time to time of standardization for the performance of various laboratory examinations; the elevation of the scientific and professional status of those specializing in this branch of medicine and the encouragement of closer coöperation between the practicing physician and the clinical pathologist. That there has been a measure of realization of these objectives I firmly believe.

A brief description of the progress that has been made in this field during the last quarter of a century may interest the readers of MINNESOTA MEDICINE. I do not believe that I make any overstatement of facts in the contention that much of the progress has been due to the activities of the American Society of Clinical Pathologists. One of its active members, Dr. Warren T. Vaughan, succeeded his father, Dr. Victor C. Vaughan, as editor of the *Journal of Laboratory and Clinical Medicine*. This journal has been in existence two years longer than MINNESOTA MEDICINE and its volumes record the introduction and development of many of the laboratory procedures that have become routine in an up-

From the Division of Clinical Pathology, the Mayo Clinic, Rochester, Minnesota.

CLINICAL PATHOLOGY—SANFORD

to-date clinical laboratory. The American Society of Clinical Pathologists, since 1931, has published the widely read *American Journal of Clinical Pathology*. Dr. Magath was the able editor of this journal for the first six years of its existence. Advances in the field of clinical pathology are not made necessarily by the clinical pathologist but rather are made for him by investigators in the fields of physiology and clinical medicine; however, the actual worth of new procedures finally is tested by their routine use in clinical laboratories and by comparison of the results reported by clinical pathologists.

In the field of hematology the well recognized development is due to the better understanding by both clinicians and clinical pathologists of the methods of cytologic study and the management and treatment of diseases of the blood and blood-forming organs. Through the teachings of Dr. Hal Downey and his colleagues and former students, the careful preparation of blood films and their staining for study have been greatly improved. Innumerable articles on hematology have appeared in all medical journals during the past quarter of a century. Some of the interesting papers on this subject that have appeared in MINNESOTA MEDICINE are as follows: In 1927 E. T. F. Richards wrote on "Infectious Mononucleosis"; in this paper he covered his experience during the period back to 1921. In the same volume an editorial on "Glandular Fever (Infectious Mononucleosis)," appeared which contained the statement that the question as to which term is proper is for the hematologist to settle. Six years later, in volume 16, R. C. Logefield reported a case of "Acute Mononucleosis or Glandular Fever." He stated that the case was reported because this disease was more common than generally recognized; he reemphasized the importance of careful morphologic study on blood cells when diseases were present which involved any part of the hemopoietic system. This paper was read at one of the early meetings of the Minnesota Society of Internal Medicine. In 1930, in volume 13, C. H. Watkins and F. J. Heck published a paper read at a meeting of the Minnesota State Medical Association on "The Practical Value of Examination of Blood Smears." In volume 14, R. C. Logefield reported a case of agranulocytic angina and stated that seventy-nine cases of undoubted agranulocytic angina had been

reported in the literature at that time. Two years later in volume 16, E. T. F. Richards and Kano Ikeda published a paper on "Agranulocytosis." In volume 23, J. M. Adams and R. F. Cochrane published a paper on "Erythroblastosis (Icterus Gravis) in the Newborn." They recognized the high familial tendency in this disease. However, this was before the rôle of the Rh factor as a possible cause was considered. In volume 22 appeared an editorial on "The Megakaryocyte" with several good references to the literature of 1938. In that editorial reference is made to the statement by Castle that Hodgkin's disease is a megakaryocyte tumor. The whole study of the megakaryocyte was directed toward determining the value of examinations of bone marrow as a clinical laboratory procedure.

In the field of serology, although there has been no real change in the basic methods, a remarkable development in modifications of the complement fixation tests and of the flocculation tests has occurred in the last twenty-five years. In volume 1, J. H. Stokes wrote in an article entitled "Medical Coöperation in the Problem of War Syphilis" as follows: "If the negative Wassermann is destined to yield in some degree to clinical judgment, the positive Wassermann must, in its turn, have a restoration to medical confidence." At that time, the Army serodiagnostic test was based on the Noguchi and Bronfenbrenner antihuman hemolytic system. This was not a particularly sensitive test. In 1922, the Kolmer modification of the Wassermann technique and the careful studies concerning the preparation of various reagents were developed. At the same time, the Kahn flocculation test became a much favored method for the serodiagnosis of syphilis. In volume 10, Margaret Warwick wrote an editorial on "The Kahn Precipitation Test for Syphilis." This was in 1927. She stated, "It may not be too presumptuous to predict that in the not too distant future it may entirely supersede the old Wassermann reaction in the laboratory diagnosis of syphilis." Fifteen years later it is interesting to note in this connection that although this and other flocculation tests are considered extremely valuable, it is not believed that they should supersede the complement fixation test but rather should be used in conjunction with it. Shortly after the development of the Kahn test, Kline described his microscope slide precipitation

CLINICAL PATHOLOGY—SANFORD

test and Hinton developed a highly satisfactory flocculation test requiring overnight incubation in the water bath. This along with the Eagle flocculation test and the Eagle complement fixation test became a standard test in this country after the 1935 evaluation of serodiagnostic tests for syphilis, conducted by a joint committee of the American Society of Clinical Pathologists and the United States Public Health Service.

In the selection of donors for transfusion, there was considerable confusion owing to the numerical designation of the four blood groups. The various societies concerned, including the American Society of Clinical Pathologists, suggested that the letters AB be substituted for group I of the Moss classification, A for group II, B for group III and 0 (zero) for group IV. Fifteen years ago in an editorial in *MINNESOTA MEDICINE*, I suggested that the reports could be made in such a way that these letters were included in brackets after the numbers. Use of the numbers has ceased, and in the literature and in reports from the laboratory to the clinician, groups are referred to only by the letters AB, A, B and 0. This classification was proposed by Landsteiner, the discoverer of blood groups. The demonstration of M, N and MN groups is of academic interest and also of practical use in medicolegal cases, but by far the most important new investigations on the blood are in relation to the Rh factor. To this factor apparently can be attributed many unexplained reactions after transfusions with blood of the correct group and it also provides a most striking explanation for the cause of erythroblastosis.

In the field of bacteriology the diagnosis of undulant fever by use of agglutination tests and also cultures of blood for the organism has been a development of the past quarter of a century. Recognition of the importance of this disease began to appear in *MINNESOTA MEDICINE* in volume 12 in an article by F. J. Hirschboeck presented at the meeting of the State Association in 1929. In the same volume R. W. Giere reported a case of Malta fever. He referred to Evans' report in 1928 of sixty-five cases. Also in this same volume, C. O. Kohlbry reported a case of undulant fever of an infant, one year old. In volume 13, E. C. Bayley had an article on the same subject. In volume 14, A. C. Fortney reported four cases. In volume 16 was published the address on "Undulant Fever (Brucellosis)" which

Walter M. Simpson read before the meeting of the State Association in 1933. At that time he stated that during the past five years undulant fever had evolved from the obscurity of a clinical curiosity to the prominence of a permanent public health problem. Eight years later in volume 24, another address by Simpson on the same subject appeared; it also was presented before a meeting of the State Association. In the same volume, I. Fisher published a paper on "Brucellosis."

During the same period, tularemia became recognized as an important disease and its diagnosis is made in a similar manner by agglutination test and by culture. An editorial by Margaret Warwick in volume 11, 1928, brought attention to Simpson's report of the appearance of tularemia in Dayton, Ohio. In volume 16, in 1933, H. R. Hartman, D. C. Beaver and F. G. Green reported on "The Occurrence of Tularemia in Minnesota in 1921: Report of Two Cases—One Fatal with a Necropsy Report." E. C. Hanson and R. G. Green also had reported on "Tularemia in Minnesota" in the *Journal of the American Medical Association* for June 8, 1929. By 1932 the number of cases in the State Department of Health of Minnesota made it evident that tularemia had become of epidemiologic significance in Minnesota. Probably the first case in Minnesota was reported in *MINNESOTA MEDICINE* in 1927 by L. H. Rutledge from Becker County.

Another disease which is diagnosed chiefly by an agglutination test is that of Rocky Mountain spotted fever. An editorial in volume 15 in 1932 brought attention to the appearance of this disease in Minnesota and to the use of the Weil-Felix reaction for confirmation. In 1936, H. A. Reimann published an article in volume 19 on "Rocky Mountain Spotted Fever in Minnesota: Report of the Second Indigenous Case and Biologic Studies." He emphasized that biologic and bacteriologic tests were necessary for diagnosis.

It is impossible to mention in detail all of the various improvements in technical procedures for the culture of organisms, both aerobic and anaerobic, that have been developed in the last quarter of a century. The preparation of media of all sorts has been greatly simplified by the accurate preparation of media and the marketing of them in a dehydrated state. Numerous modifica-

CLINICAL PATHOLOGY—SANFORD

tions of culture media have increased the reliability of differential diagnoses in the field of bacteriology as performed in the clinical laboratory. The demonstration of acid-fast bacilli stained with auramine O by fluorescence microscopy is perhaps the most recent development in the examination of sputum and other materials for *Mycobacterium tuberculosis*. Within the last few years there has been an increasing interest in histoplasmosis, caused by *Histoplasma capsulatum*, now known to be a fungus disease. Torula meningitis, caused by an organism classified by Todd and Herman and confirmed by A. T. Henrici as *Debaryomyces neoformans*, is receiving an increasing amount of attention in clinical laboratories. The same may be said for infections with *Coccidioides immitis*.

Parasitology, as a special field in zoölogy, requires highly specialized training and has a history which is older than that of bacteriology, as many protozoal parasites were discovered before pathogenic bacteria were known. During the past twenty-five years, parasitology has been of continued and increasing interest in the clinical laboratory. MINNESOTA MEDICINE has contributed its share to the literature of importance in this field. In volume 10 an editorial on "Infected Fish" referred to an article in the same volume by T. B. Magath on "Experimental Studies on *Diphyllobothrium latum*." This was a preliminary report. In the next volume, R. O. Christenson and W. P. Greene reported "Studies on Biological and Medical Aspects of 'Swimmer's' Itch." This was the first report of schistosome dermatitis in Minnesota. In volume 12, W. A. Riley had a paper on "The Importance of Stained Preparations in the Study of Amebic Infections." In the same volume P. W. Brown published a paper on "The More Common Intestinal Parasites of the Northwest." This subject had been presented from the Mayo Clinic fifteen years or more before this report. R. L. Wilder and F. C. Rodda in this same volume presented an article on "*Diphyllobothrium latum* (Fish Tapeworm) Infestation in Children: Report of Two Cases." In volume 14, R. J. Moe and W. A. Coventry published a paper on "Trichomonas Vaginalis Vaginitis," in which they reported ninety-five cases of their own. They stated that the frequent occurrence of *Trichomonas vaginalis* had activated an interest which had then reached its peak. This organism was discovered by Donné in

1836. In volume 15, E. D. Plass published a paper on "Recent Advances in the Study of the Cause and Treatment of Leukorrhea." *Trichomonas vaginalis* was emphasized as a probable cause. An editorial appeared in volume 16 on "Amebiasis and a Century of Progress." The editor concluded that it seemed evident that amebiasis was not being diagnosed generally. In volume 17, J. N. Gehlen reported a case of amebiasis complicated by abscesses of the liver, lungs and brain. In volume 18, P. W. Brown and T. B. Magath had an article on "Amebiasis: Diagnosis, Prevention and Treatment."

Perhaps the greatest advances in laboratory medicine have been made in the field of blood chemistry. As physiologists and research workers have proved the reliability and diagnostic worth of new procedures in physiologic chemistry, the clinician turns to the clinical chemical laboratory for these aids to routine diagnoses. Much of this work originated about twenty to twenty-five years ago. In 1923, Moses Barron published in MINNESOTA MEDICINE a paper that was read in October, 1922, at the state meeting on "The Value and Importance of Blood Chemistry in Clinical Medicine." At this time he especially emphasized the blood sugar test, the urea determination, creatinine determination and uric acid determination. Since that time there have been numerous changes in technique. New methods have been devised for the determination of amino acid nitrogen in blood. Sullivan's work on the determination of cysteine and cystine has become the standard. The methods of determining the concentration of cholesterol and cholesterol esters in the blood are practically the same as those of a quarter of a century ago, although changes have been made in the technique for determinations of phospholipid. New methods have been devised for the determination of blood chlorides and the sugar tolerance test has been partially supplanted by the one-hour, two-dose tolerance test of Exton and Rose, brought out in 1934. There have been recent modifications in the methods of determining calcium, phosphorus and phosphatase. The method for the determination of iron in the blood was developed about fifteen years ago. This method and also the Van Slyke oxygen capacity method have been considered standard methods for the quantitative determination of hemoglobin; however, the most recent method for determination of hemoglobin is the photometric

CLINICAL PATHOLOGY—SANFORD

method used now for about twelve years. The photelometer also has been used for a number of other chemical determinations and a number of similar photo-electric colorimeters are now in use.

As a test of renal function, the urea clearance test was devised about twenty years ago. Recently considerable attention has been paid to the study of clearance of other substances besides urea, such as inulin and diodrast. Sulfate and sulfate clearances have attracted attention. Determinations of sodium and potassium in the blood and urine have become clinical laboratory procedures. Great interest has been directed toward the quantitative estimation of bile pigment in the blood serum and toward the development of various tests of liver function. The Rosenthal bromsulfalein test and Delprat's rose bengal test came into general use about seventeen or eighteen years ago. The galactose tolerance test has been in use for more than ten years. More recently Quick's hippuric acid test has been developed. The Quick prothrombin time test which is used chiefly as a test for the study of coagulation factors also may be used as a test of liver function after the administration of Vitamin K. The use of sulfanilamide and sulfonamide drugs now has brought about the determination of these substances in the blood and urine as a clinical laboratory procedure. I might mention many more substances for which quantitative determinations must be made in clinical investigation. The research of today becomes the routine of tomorrow in this ever-expanding field of laboratory medicine.

In connection with clinical pathology the vocation of medical technology for well-trained women has developed. Twenty years ago in volume 6, W. E. King presented a paper on "The Training of the Laboratory Technician." In the same volume of MINNESOTA MEDICINE, Kano Ikeda presented a paper on "Standardization of Clinical Laboratories and Technicians." In the discussion of this paper R. O. Beard outlined the proposed plan for the University of Minnesota, School of Medical Technology. This was started twenty years ago. In 1923 there were two graduates. From that time through June, 1942, there have been 471 graduates. In volume 17, 1934, of MINNESOTA MEDICINE, Ikeda, as secretary of the Board of Registry of Technicians of the American Society of Clinical Pathologists, pub-

lished an article on "Laboratory Technicians." He stated, "Today it is generally accepted that the particularly technical or mechanical part may be invested wisely in the hands of trained medical assistants, whose duty it shall be to devote their skill and energy in the performance of the various technical methods demanded of the laboratory." The Board of Registry was established fourteen years ago in 1928. Standards for the training have been well laid down by the American Society of Clinical Pathologists and the American Medical Association. A minimum of two years of college work with training in basic sciences plus at least twelve months of intensive training in a hospital laboratory training school is required before the technician is eligible for examination for registration. There are now many thousands of registered technicians and up to the present the supply does not meet the demand. Commercial schools have been set up which pretend to give adequate training; these advertise in lay journals but offer little for the high tuition charged. However, the standard for recognized hospital laboratory training schools has been kept high by the American Society of Clinical Pathologists and the American Medical Association, so that for the most part technicians are really well trained.

Reference has been made to the American Board of Pathology and its definition of clinical pathology as a specialty in medicine. In June, 1935, the Section on Pathology and Physiology of the American Medical Association and the American Society of Clinical Pathologists appointed committees which acted jointly in consideration of the formation of an American Board of Pathology. The Board was organized July 19, 1936. There was an immediate response on the part of pathologists all over the country for certification by this Board as to their qualifications either as specialists in pathologic anatomy or clinical pathology or both. Up to the time of the preparation of the 1942 edition of the *Directory of Medical Specialists*, certified by the various American Boards, more than 800 specialists had been certified by the American Board of Pathology. Since that time more than 150 more candidates have either passed the examination or have applied for examination. Of the number whose names appear in the *Directory*, 148 are certified in pathologic anatomy alone, ninety-one are certified as clinical pathologists

ANESTHESIOLOGY—LUNDY

alone, while 566 are certified in both pathologic anatomy and clinical pathology. In other words, in this 1942 Directory more than 650 specialists are listed who are qualified in the field of clinical pathology. As would be expected, these are distributed according to population. The most populous states of California, Illinois, New York and Pennsylvania have the largest number that are certified. In New York State there are more than 100 qualified clinical pathologists, in Pennsylvania more than seventy, in California about fifty and in Illinois nearly forty. Minnesota has five specialists that are certified in clinical pathology alone and ten in both clinical pathology and pathologic anatomy. Seven men are certified in both clinical pathology and pathological anatomy in the Provinces of Canada, three in Hawaii, three in Puerto Rico, one in the Canal Zone and one in the Philippine Islands.

MINNESOTA MEDICINE appeared at a time

when the country was making every effort toward winning the World War of 1914-1918, and now at the time of the publication of the Twenty-fifth Anniversary number the medical profession and the entire nation are discussing many of the same problems. It became evident when physicians were called to service that there was a shortage of clinical pathologists both for military service and for the civilian population. While from necessity training in specialties for many recent graduates must be deferred for the time being and while it is not proper nor safe to make too sweeping predictions about the future, it is fair to assume that this specialty will continue to attract young men who are interested in laboratory medicine and scientific methods for diagnosis, and that the next quarter of a century will see proportionately greater strides in all fields of medicine and particularly in the use of the laboratory.

TWENTY-FIVE YEARS OF "MINNESOTA MEDICINE" AND OF ANESTHESIOLOGY

JOHN S. LUNDY, M.D.
Rochester, Minnesota

THE journal, MINNESOTA MEDICINE, is twenty-five years old. Within that period, the specialty of anesthesiology has greatly developed. The state of Minnesota has contributed its share in this development and MINNESOTA MEDICINE has done its part. I shall emphasize Minnesota contributions but, obviously, it would be impracticable to confine this review to achievements in any one state.

Local and Spinal Anesthesia

From an historical point of view, the late R. E. Farr, of Minneapolis, comes to mind in regard both to MINNESOTA MEDICINE and anesthesiology. He was instrumental in bringing MINNESOTA MEDICINE into existence and anesthesia, especially local anesthesia, was a primary interest among his many activities. In 1923 he published his textbook on local anesthesia.⁸ This had a salutary effect on local anesthesia throughout the country and was a potent factor in arousing interest in the use of local anesthesia.

From the Section on Anesthesia, The Mayo Clinic, Rochester, Minnesota.

To begin at the beginning of the story, however, it should be said that, prior to the time of publication of Farr's book, attempts to interest people in local and spinal anesthesia had been made in Minnesota. As early as December, 1909, Thomas Jonnesco⁹ anesthetized three patients at the Rochester State Hospital, using spinal anesthesia. In one case amputation of the forearm was performed and Jonnesco wrote, "In this case analgesia was perfect. The patient was conscious and had no ill effects whatever, either during or after the operation." W. C. MacCarty, who saw the demonstration, has said that stovaine was the agent used. However, it was not until 1920, when C. H. Mayo brought Gaston Labat from Paris to Rochester for a period of ten months, that local, regional, and spinal anesthesia were given real trials in Rochester. Gaston Labat's textbook, "Regional Anesthesia; Its Technique and Clinical Application" (1922)⁷ did a great deal toward more general acceptance of regional methods of anesthesia. After Labat's departure, William R. Meeker continued Labat's work for a lit-

ANESTHESIOLOGY—LUNDY

tle more than two years. In the latter part of 1923 the work was carried on by various fellows in surgery of the Mayo Foundation. The one who kept the fires burning was W. H. Sprunt. He was active in this capacity for the first half of 1924 and introduced me to the various procedures then in use in regional and local anesthesia. Interestingly, spinal anesthesia was used in Rochester but once that year and was not used in 1925 or 1926.

Since that time spinal anesthesia has become more and more widely used. Various local anesthetic drugs have been introduced, such as nupercaine, pontocaine and metycaine. The problem had been how to give a safe dose and at the same time produce anesthesia that would last for a long enough period. This problem was finally solved by W. T. Lemmon⁸ of Philadelphia, in 1940, when he presented his method of continuous spinal anesthesia. This is a very valuable contribution and demonstrates how a new method can increase the usefulness of an old agent such as procaine. R. A. Hingson, of the United States Public Health Service, had training in anesthesia in the Mayo Foundation in Rochester, in 1940-1941. In 1941, shortly after he left Minnesota, he developed, in conjunction with W. B. Edwards,⁹ a method of continuous caudal anesthesia in obstetrics. This method is full of promise, as it can be used for labor as well as for delivery. It demonstrates the different origins of the sensory and motor innervation of the uterus and is the newest method in anesthesia at the present time.

Anesthesia by Inhalation

Some pioneer work in inhalation anesthesia was done in Minnesota. For example, the open drop method of administering ether was brought to a high state of development in Rochester by nurse anesthetists¹⁵ under the supervision of A. W. Stinchfield and Isabella Herb.

Chloroform has not been in favor in institutional practice in Minnesota during the last twenty-five years. However, it has been used to some extent in rural practice, especially for obstetrics. Administration of chloroform occasionally is associated with sudden cardiac failure; in some cases there is delayed central necrosis of hepatic lobules, with fatal issue. From time to time it has been suggested that this drug be administered with oxygen in order to avoid the hepatic

damage. This technique has not been perfected, however, although some day it may be. It is said that sulfanilamide, as well as xanthine, prevents hepatic damage from chloroform. I have not used chloroform since 1927.

The story of gas anesthesia in Minnesota begins at least as early as 1900, in so far as surgical cases are concerned. It was first used in Rochester on November 25, 1900, and in a few cases that month and the next. It was not used again in Rochester until October, 1918, when the dental surgeon, Boyd S. Gardner, employed nitrous oxide and oxygen for dental extraction. It has been in continuous use in Rochester since that time. In Minneapolis, J. A. Heidbrink had been using gas anesthesia for some time. In 1910 he developed the technique of "timed anesthesia," in which nitrous oxide and oxygen, instead of nitrous oxide and somnoform were used. He used reducing valves as flow meters. In the following years, in association with B. J. Clark, Heidbrink developed the gas machine that bears his name. The machine was for use not only in dental surgery but in general surgery, and Heidbrink's machine and technique became used throughout the world. About this same time, Connell, McKesson, Forreger and others began the manufacture of gas machines. In 1918, Luckhardt and Thompson were experimenting with ethylene as an anesthetic agent and it came into clinical use in March, 1923. It was brought to Minnesota and used in Rochester in May, 1923.

In 1925, Ralph M. Waters introduced the soda lime absorption method of gas anesthesia; a method which made possible clinical introduction of the gas, cyclopropane, by Waters, Neff and Rovenstine in 1933. This was a great advance in gas anesthesia and there has been no marked advance along that line since that time except for the work of Woodbridge and Tovell in studying measures to minimize the explosive hazard of anesthetic mixtures.

Divinyl ether was suggested by C. D. Leake,⁶ now of Texas, in 1930 and was recommended for clinical use by Goldschmidt, Ravdin, and associates,⁴ in 1933. Divinyl ether has proved to be a useful anesthetic agent for short, minor operations.

Rectal Anesthesia

Rectal anesthesia was developed in a practical way by Gwathmey, in 1913, and in his book,

ANESTHESIOLOGY—LUNDY

"Anesthesia," published in 1914, considerable space was devoted to the use of ether and oil by rectum. The method became well known and was used extensively, especially in obstetrics, until tribromethyl alcohol was introduced and became generally accepted in 1926. The rectal method of anesthesia is accepted less as the sole method of anesthesia than as a means of production of basal narcosis, to be supplemented by other methods such as local, inhalation, or intravenous anesthesia. However, it is useful in certain situations; especially when a patient has to be treated in a dark room under roentgenoscopic control. The development of rectal anesthesia took place very largely in the last twenty-five years.

Intravenous Anesthesia

Intravenous anesthesia, which was first used by Ore, of France, in 1872, when he injected chloral hydrate intravenously, did not become widely used for many years, although a number of agents were tried. The story of this development will appear in R. C. Adams' forthcoming book on intravenous anesthesia. It was not until 1929, when Zerfas¹⁴ reported on the use of sodium amytal, given intravenously, that the modern trend toward the use of intravenous anesthesia developed. I made one of the early reports on the use of sodium amytal in Minnesota, in 1930,¹⁵ and the following year I made a report on the use of sodium nembutal (pentobarbital sodium)¹⁶ as an anesthetic agent for intravenous use. These drugs were not satisfactory; therefore, the method did not become generally accepted. In 1932, Weese and Scharpf¹⁸ introduced evipan, now called evipal, and great interest was aroused in the intravenous method. In 1935 I reported the use of pentothal sodium for intravenous anesthesia¹² and, since that time the method has become widely adopted because the agent has been relatively satisfactory; however, in further investigations better agents may be developed.

Endotracheal Anesthesia

One of the great advances in anesthesia was made by I. W. Magill, of England, in 1920, when he modernized endotracheal anesthesia. In 1928, in Winnipeg, at a joint meeting of the British and Canadian Medical Societies, he read a paper on endotracheal anesthesia and presented an in-

tratracheal tube of large bore and made of relatively soft rubber. He visited me in Rochester and left with me his equipment, including laryngoscope, connectors and tubes. I persuaded the Heidbrink Company of Minneapolis to manufacture the Magill rubber intratracheal tubes. Of course, competitors followed their example and shortly the tubes were generally available and were widely used, to the great advantage of patients, surgeons and anesthetists. The endotracheal method is one of the most valuable techniques in all of anesthesia.

Research

The foregoing is evidence that clinical anesthesia has made much progress in the last twenty-five years. A good deal of research also has been carried on in this field, not only in laboratories of chemistry but also in laboratories of physiology, pharmacology and anatomy. Unfortunately it cannot be assumed that the human being will react exactly as the laboratory animal does to various agents and methods. Still, in general the effects are similar and progress in clinical anesthesia is in a large part dependent on further knowledge obtained from laboratory experiments. This is true also in fields allied to anesthesia, which have come to be included in the field of anesthesiology. Oxygen therapy, transfusion of blood,^{16,17} treatment of shock and use of supportive measures, including administration of stimulants, have seen their greatest development in the last twenty-five years. The extensive use of refrigeration has made possible so-called blood banks. The development of processes for drying plasma and for solidly freezing it have added to the scope of use of this material; thus medical practice has been improved, many lives have been saved and plasma will be of the greatest value in the present war.

Publications, Organizations and Minnesota's Educational Efforts

From the standpoint of publications and development of organizations of anesthetists, most such progress has occurred in the last twenty-five years. In 1920, Crile and Lower¹ published their book on anesthesia. Labat's book has been previously mentioned. Publication of the magazine, *Current Researches in Anesthesia and Analgesia*, began in 1922. In the same year, in England, occurred the first meeting of the Section on Anes-

thesis of the British Medical Association. In 1923, the *British Journal of Anesthesia* was issued for the first time. In 1927, the first meeting of the Section on Anesthesia of the Canadian Medical Association was held. In Germany, in 1928, was begun the publication of *Narkose und Anaesthésie* and, in 1929, the publication *Schmerz* was united with the former. The year 1933 saw the first publication of the *Bulletin of the National Association of Nurse Anesthetists*. In Italy in 1935, the *Giornale Italiano di Anesthesia e di Analgesia* was first published, and the same year, in France, saw inauguration of the new journal *Anesthésie et Analgesie*. In 1937, the American Board of Anesthesiology, Incorporated, was formed. In the same year Guedel published his book "Inhalation Anesthesia." It was also in 1937 that, in Minnesota, "Anesthesia Abstracts" first appeared. In 1938, Beecher published his "Physiology of Anesthesia." In Argentina, in 1939, publication of the journal *Revista Argentina de Anesthesia y Analgesia* was begun. Publication of the journal, *Anesthesiology*, was started in 1940 and, in the following year, the first meeting of the Section on Anesthesiology of the American Medical Association was held. "Fundamentals of Anesthesia" was prepared by the Subcommittee on Anesthesia of the National Research Council and was published by the American Medical Association in 1941. "Endotracheal Anesthesia" by Noel A. Gillespie was published in 1941 and "Clinical Anesthesia," a book written by myself,¹³ was published in 1942.

In education, Minnesota has taken a leading position. Since 1920, Ralph T. Knight has been in charge of anesthesia at the University of Minnesota and he has taught, and stimulated interest in the subject in the medical school of the university. He has organized the practice of anesthesia in the University of Minnesota Hospitals and in the Minneapolis General Hospital. He acts as a consultant in anesthesia to other hospitals in the Twin Cities. He has stimulated the interest of many individuals in anesthesia and has contributed to the progress of the specialty in many ways. In March, 1923, the University of Minnesota established a fellowship in anesthesia leading to the degree of Master of Science in Anesthesiology. The first person to receive this degree

was E. B. Tuohy (1936). Since that time ten have received the degree.

The Immediate Future and the Anesthesiologist's Debt to "Minnesota Medicine"

In the present war, the armed forces are making every effort to train and employ as many physician anesthetists as possible. This will increase the ranks of anesthetists considerably and it would be reasonable to suppose that, after the war is over, and those men return to civilian practice, the specialty of anesthesia will receive the same impetus that thoracic surgery received after the war of 1914-1918. With respect to its past progress and future prospects, the specialty of anesthesia owes a debt of gratitude to MINNESOTA MEDICINE for the many papers on anesthesia and allied subjects which it has published. I can fittingly close this necessarily incomplete review by wishing for MINNESOTA MEDICINE a long and successful existence. This I believe to be the desire of all Minnesota physicians and many others elsewhere.

References

1. Crile, G. W., and Lower, W. E.: Anoxic-association. Philadelphia: W. B. Saunders Company, 1914.
2. Edwards, W. B., and Hingson, R. A.: Continuous caudal anesthesia in obstetrics. *Am. Jour. Surg.*, 57:459-464, (Oct.) 1942.
3. Farr, R. E.: Practical local anesthesia. Philadelphia: Lea & Febiger, 1923.
4. Goldschmidt, Samuel, Ravidin, I. S., Lucke, Baldwin, Muller, G. F., Johnston, C. G., and Ruigh, W. L.: Divinyl ether: experimental and clinical studies. *Jour. A.M.A.*, 102:21-27, (Jan.) 1934.
5. Gwathmey, J. T.: Obstetrical analgesia: a further study based on more than 20,000 cases. *Anesth. and Analg.*, 10:256-262, (Nov.-Dec.) 1931.
6. Knoefel, P. K., Guedel, E. A., and Leake, C. D.: Experimental observations on the anesthetic properties of divinyl ether. *Proc. Soc. Exper. Biol. and Med.*, 29:139-140, (Nov.) 1931.
7. Labat, Gaston: *Regional anesthesia*. Philadelphia: W. B. Saunders Company, 1922.
8. Lemmon, W. T.: Method for continuous spinal anesthesia; preliminary report. *Ann. Surg.*, 111:141-144, (Jan.) 1940.
9. Letters to the editor: Remark on general spinal anesthesia. *New York Med. Jour.*, 91:43-44, (Jan. 1) 1910.
10. Lundy, J. S.: Intravenous anesthesia; particularly hypnotic, anesthetic and toxic effects of certain new derivatives of barbituric acid. *Anesth. and Analg.*, 9:210-217, (Sept.-Oct.) 1930.
11. Lundy, J. S.: Experience with sodium ethyl (1-methylbutyl) barbiturate (nembutal) in more than 2,300 cases. *Surg. Clin. North America*, 11:909-915, (Aug.) 1931.
12. Lundy, J. S.: Intravenous anesthesia: preliminary report of the use of two new thiobarbiturates. *Proc. Staff Meet., Mayo Clin.*, 10:536-543, (Aug.) 1935.
13. Lundy, J. S.: Clinical anesthesia. Philadelphia: W. B. Saunders Company, 1942.
14. McCallum, J. T. C., and Zerfas, L. G.: Sodium iso-amyl-ethyl barbiturate. *Am. Jour. Surg.*, 8:39-43, (Jan.) 1930.
15. Magaw, Alice: A review of over fourteen thousand surgical anesthetics. *Surg., Gynec. and Obst.*, 3:795-799, (Dec.) 1906.
16. Pemberton, J. deJ.: Blood transfusion. *Surg., Gynec. and Obst.*, 28:262-276, (Mar.) 1919.
17. Tuohy, E. B., and Lundy, J. S.: Intravenous administration of blood and other substances for surgical purposes. *Surg. Clin. North America*, 20:1093-1106, (Aug.) 1940.
18. Weese, H.: *Pharmakologie des intravenösen Kurzmarkotums Evipan-Natrium*. Deutsche med. Wchnschr., 1:47-48, (Jan.) 1933.

ABDOMINAL PAIN

ARNOLD SCHWYZER, M.D.
Saint Paul, Minnesota

OUR understanding of the pathways of the conduction of abdominal pain has been cleared up only during more recent years. That the parietal peritoneum is very sensitive was well known, but what about the intra-abdominal organs? In 1898 Jaboulay made the attempt to relieve pelvic pain by attacking the sacral sympathetic chain through an approach from behind the rectum. This did not bring distinct results. Fontaine and Hermann of Strasbourg (1932) gave a good historic picture of the development of the surgical measures on the pelvic sympathetic nerves in gynecology where they mention that Ruggi, about a year after Jaboulay, published his "work on abdominal sympathectomy in functional disturbances of the female genital organs." He advised the resection of the utero-ovarian plexus by the transperitoneal route. For a long time gynecologists had examined closely the distributions of the pelvic sympathetic nerves. Lee of England (1849) and Frankenhaeuser of Zurich (1867) had studied the nerves of the uterus.

Then came Lennander, the surgeon of Upsala, in 1906 with his epoch-making observations on the perception of pain in the abdominal organs. Though we now know that they are but partially correct, his findings stimulated the study of this subject. He told us that all of the organs which were only supplied by the sympathetic or the vagus below the branching off of the recurrent laryngeal nerve had none of the four kinds of sensation, namely pain, pressure, heat and cold perception. This he demonstrated convincingly concerning bone substance, bone marrow, cartilage, thyroid, lung, stomach, intestine, mesenteries, omentum, gall bladder, liver, pancreas, spleen, the serosa of the urinary bladder, also the kidney parenchyma after the renal fat is completely removed from the fibrous capsule. On the other hand he found perception of pain on the periosteum, the joint capsules, the parietal pleura and the parietal peritoneum. Concerning these two large body cavities, pleura and peritoneum, he stated that what hurt most was a displacement of their delicate lining membranes over the underlying tissues. The nerves which

run in the subserosa and which are irritated by pulling on them are of somatic origin, branches of the intercostal, lumbar, and sacral nerves. Lennander's positive observations were of greatest practical importance for the abdominal surgeon who in those days liked to operate where possible under local anesthesia. Lennander did not know of the pain-conducting fibres in the sympathetic, which gynecologists had recognized. The important thing which resulted from Lennander's research is the fact that apart from the pelvic organs and perhaps some portions of the splanchnic nerve along the deeper biliary channels his observations hold good in most of the work which the surgeon is called upon to do in the abdomen.

Mackenzie and Head made valuable contributions in developing the conception of so-called segmental referred pain. Mackenzie's law states that "when a painful stimulus is applied to a part of low sensibility in close central connection with a part of much greater sensibility, the pain produced is felt in the part of high sensibility rather than in the part of lower sensibility to which the stimulus was actually applied." As I understand these authors, visceral and somatic receptor centers are closely associated and through a visceral stimulus an irritated state occurs in this central area which causes a lowered threshold of sensation. As a consequence normal painless stimuli from the body surface which are always present are felt as pain, which is referred to the corresponding surface district.

So much for a short orientation in referred pain. This paper is written from the standpoint of the practitioner as a clinical talk. Operating under local anesthesia has allowed us to verify Lennander's statements time and again. Their value lies in the observation that large areas have no sensation. When an abdominal operation is done under local anesthesia it is most important to avoid pulling on the intestines as the posterior mesenteric attachment is keenly sensitive. The segmental referred pain transmitted through the autonomic system plays a minor role in *praxi* compared with local tenderness which travels through somatic channels. Referred pain may

ABDOMINAL PAIN—SCHWYZER

mislead the surgeon if he is not constantly aware of its possible abnormal localization. The pain may be very severe. It is seldom as definite and circumscribed as local tenderness due to a localized inflammatory condition. However, it may at times simulate even such a condition.

For example last winter I had a patient who had suffered for years from headaches and a vague abdominal distress. She then developed a marked local tenderness under the *left* border of the ribs. She was thoroughly discouraged and when one pressed under the left border of ribs she winced with pain while she did not complain when the same pressure was applied on the right side. X-ray examination of stomach, colon, and also for possible diaphragmatic hernia, gave normal findings. The gall bladder, too, functioned normally on roentgenologic study. The history was quite vague. The patient was generally run down and despondent on account of carcinophobia; but she was not of the common complaining kind. The proposal to open and examine was gladly accepted by the patient, a fact which confirmed our impression that there must be some definite pathologic process behind all this. At operation the stomach and all the left-sided organs were found to be normal. The gall bladder, which we had under suspicion, having made an x-ray examination some time before, was white but did not show any further changes like adhesions, nor was there a fibrous network in the overlying liver tissue commonly found in chronic infection of the gall bladder. There were no stones. Hesitatingly we removed it and also a long somewhat club-shaped appendix. On opening the gall bladder it proved to be of the strawberry type. Eight days after the operation the notes read that she felt very well, was up and about since two days after the operation, and had no complaint. The daily headache from which she had suffered for fifteen years had gone since the operation and also the left-sided pain. None of these symptoms has troubled her from then on. Here we had a misleading localization of a referred pain on the opposite side.

In judging the subjective localization of pain we must also consider the following. The newborn baby does not have the ability to locate pain from the start. It has to learn first from which area a certain pain comes. This pain is then projected to the corresponding surface. Gustatory sensations (like all others) are formed

in the brain, but projected to the mouth. Visual and auditory sensations are projected to locations outside of us at some distance. The baby learns this gradually by way of control and comparison. But we have very little or no experience with an exact localization of pain in the abdomen apart from the parietal peritoneum. Our ability to localize a pain inside is simply not developed. *In praxi* I find that surprisingly often the patient localizes his pain wrongly as to the affected side.

It is apparently proven experimentally, but not really understandable, that abnormal distension or contraction of a viscous can cause pain though the surgeons have proved that other painful manipulations as pinching, cutting, or burning are painless if pulling is avoided. After having observed this in hundreds of laparotomies under local anesthesia I cannot bring myself to accept the conclusions drawn from these experiments. Balloons were placed into the gall bladder and again into the duodenum and then distended. There must always occur a displacement or pulling to some extent on the neighboring posterior peritoneum which is extremely sensitive. This may explain the findings in experimental work. Pulling on the gall bladder is painful, but crushing or cutting it is not. An abnormally firm contraction will have a pulling quota on the adjoining posterior peritoneum, the same as distension.

An inflamed intestine or appendix does not hurt when pinched at operation unless we pull on these organs. Then the pain is severe because the posterior peritoneum is exquisitely sensitive to any degree of traction. And this is of course much worse when the posterior attachment is irritated by a continuation of the inflammation of the viscous. The most delicate handling of the intestines and particularly avoidance of any pulling is necessary to operate painlessly. Severe crampy contraction of part of the stomach wall where it is grasped by a probang during an operation is not felt in the least. The whole circumference of the small or large intestine can be caught in a crushing clamp and if we avoid pulling on the mesentery there is no sensation. There is no sensation even if a short loop of small intestine is in such firm contraction as to form a solid cord which one can see at times when operating under local anesthesia.

The large intestine cannot contract forcibly in its ascending and descending portions without a

ABDOMINAL PAIN—SCHWYZER

pulling effect on the meso-colon which is very short. Thus severe contraction can well cause pain through the lateral attachment of the colon. But how about over-distention, which in experiments seemed to cause pain? If a long ileum loop is overdistended it straightens out more or less and becomes rigid, which will cause a pulling on the fan-shaped mesentery. This will not happen so readily in the small intestine as in the large one with its greater fixation. Thus the crampy pains in common minor disturbances as diarrhea have their origin practically always in the colon.

Head's and Mackenzie's findings often give valuable hints. For instance, a pain between the shoulder blades leads our attention immediately to possible gall-bladder trouble or a deep-seated ulcer. In the uppermost part of the abdomen several organs, if inflamed, will affect the same center of cutaneous sensation. The patient has no way of recognizing directly what organ causes the pain in this area. On the other hand localized tenderness, when present, is of course of particular value for a differential diagnosis.

An appendicitis patient, a man, was so emphatic that his pain was directly underneath the ensiform process and he was so incredulous as to my diagnosis that I was anxious to demonstrate to him that local tenderness over the appendix meant more than his spontaneous epigastric pain. I operated under local anesthesia. The reddened appendix rested against the posterior peritoneum. When I grasped it with an artery forceps there was no pain but when I pulled on it the patient suddenly reacted and told us emphatically with groans that he had again that old pain in the pit of the stomach but assured us that he felt absolutely no pain where we were operating. I said "if you count up to three your pain is gone." Though very evidently unconvinced he counted in a hurry, whereupon I released the tension without removing the forceps from the appendix. With a puzzled laugh he admitted the pain was gone. The pain of pulling must have been severe as he could not be induced to have the experiment repeated. We then infiltrated the mesenteries of the appendix and adjoining cecum which caused the remainder of the operation to be painless.

To corroborate the statement that even in severe inflammation the appendix and the walls of adjoining intestines have no sensation for pain

let me tell you of the following case: A woman came to my office complaining of a "dysentery" from which she had suffered for a number of days. She looked quite sick, felt miserable and had fever between 101 and 102 degrees. She complained, however, of no particular or outspoken pain. In the right iliac region there was a movable mass the size of a woman's fist. It was not tender in itself and caused only moderate discomfort on being moved about gently. Operation revealed a gangrenous appendix in an abscess which was walled off entirely by the cecum, adjoining ileum and omentum. The cecum was of the "cecum mobile" type. There was no involvement of the anterior or lateral peritoneum and there was a rather long stretch of mesentery between the inflamed gut and the posterior peritoneum.

It should be mentioned that in appendicitis we almost always find a pain at McBurney's point even if the cecum is far down in the pelvis. This is due to the fact that the lymphatics from the appendix reach the posterior abdominal wall at this point even if the cecum and the appendix are low down in the pelvis. Infected lymphatics involve promptly the adjoining tissues as one well knows from the red streaks in lymphangitis of the arm or leg. This causes the peritoneum at McBurney's point to become very tender to pressure.

Concerning appendicitis Rovsing called attention to the following symptom. On pressing into the left iliac fossa a pain is at times felt on the right side. Rovsing thought this might be due to gas being forced from the left side of the colon over to the right. However, if we consider the long stretch of colon with its flexures that the gas would have to traverse, it is evident that this cannot well be the case. The explanation most reasonable is that we displace the intestines and create some pulling on the inflamed posterior peritoneum in the neighborhood of the appendix. When an inflammatory condition is suspected and gentle pressure causes no indication of pain, sudden release may be painful. This pain on rebound is proof that the primary palpation was properly gentle and it indicates a local irritation of the posterior peritoneum.

At times pain is felt far away from the place of trouble. Thus in a case of traumatic rupture of the diaphragm in its right parasternal portion, there was a pain in the right iliac region where

there was, however, no tenderness. The radiograph showed a loop of colon in the pleural cavity reaching as far as the upper level of the heart. This pain may have been a referred pain or was caused by traction.

The center of the diaphragm is known to yield only referred pain in the neck. However, the peripheral portions of the diaphragm yield local pain. In a case of long standing fever with a history of dysentery contracted in the South, a tenderness on pressing upward underneath the border of ribs led us to recognize a liver abscess which was ready to break through on the upper surface of the liver. It was the irritation of the peripheral diaphragmatic peritoneum which gave the information.

Though I have been able to observe many times during operations that the liver has no trace of sensitiveness, very large livers cause a vague "misery" partly from pressure, but, besides this, the weight and size may produce a pulling on the different fixatory ligaments.

The most important epigastric lesions are perforated ulcer, gallstone attack, and acute pancreatitis. Their differentiation especially in reference to the character of the pain may be discussed in short. In acute perforated ulcer, pain is overwhelming and the patient does not dare to move. He lies very quiet because the pain is peritonitic and every movement increases it greatly. On the other hand in an attack of gallstone colic the excruciating pain makes the patient throw himself around, and he often cannot even stay in bed, but gets up and doubles over. In pancreatic apoplexy or peracute pancreatitis the picture is again different. The pain is steady and severe, but not as excessive as in the two just mentioned conditions (perforated ulcer and gallstone attack). Because the anterior parietal peritoneum is not involved, the local tenderness is therefore not as severe as in perforated ulcer. The abdominal muscles are contracted but not as board-like as in perforated ulcer.* In pancreatitis the trouble is located primarily in the lesser peritoneal cavity. A leakage through the foramen of Winslow will only occur, if at all, at a later stage. There is a steady great pain due to the irritation of the posterior parietal peri-

toneum, but surface displacement which is the most sensitive of all does not occur here to any great extent. The involvement of the large sympathetic tracts and solar plexus brings about the outstanding feature in this condition, which is a sensation of impending death. The pulse, which is bounding for hours after perforation of an ulcer, is very feeble and thready in acute pancreatic disease.

The gall bladder apart from gallstone colics can be the seat of a steady pain in acute inflammation. The local pain and tenderness are clear-cut and well localized, due to involvement of the anterior or posterior parietal peritoneum or the lymphatics in the latter.

Pain, even quite localized, over the gall bladder occurs in coronary disease and one may find it so sharp on pressure, that the thought of a concomitant cholecystitis is often aroused. Ravdin and Royster have shown very recently that "many of the classical signs of angina pectoris" are seen in gallstone cases and are cured by operative measures. The distinction from true angina lies in the observation that the symptoms are not elicited by physical effort. They call the condition pseudo-angina.

Other serious errors occur at times. I remember on one occasion being consulted in a case which a colleague thought to be an acute cholecystitis for which he was ready to operate. I advised him to wait with any further measures until the lobar pneumonia which had escaped him was over. The pneumonia over, the pain was gone.

Of pain due to renal affection it can only be mentioned that at times the localization is poor or even very misleading. Cases of calculi are reported where the pain was located in the sound kidney of the opposite side. In the case of a recent descent of a stone in the ureter the pain usually is excruciating and radiates toward the bladder or testis. Let me tell you of the case of a very experienced surgeon. During an operation he was caught with an overwhelming pain in his own abdomen. Morphine helped little. When I saw him the pain was still severe and the whole abdomen of this large sized man was ballooned and hard. The patient thought the right iliac was more tender than the rest and in case it was an appendicitis no time was to be lost. He wanted to have this matter settled by exploration. Like the rest of the intestines the

*In the November meeting of the Minnesota Academy of Medicine, Dr. R. T. LaVake mentioned a case of acutely perforated ulcer right after childbirth. The abdomen was not at all hard and therefore the picture was very misleading. The overstretched abdominal muscles had not yet become shortened enough to allow the abdominal walls to become firmly contracted.

appendix was somewhat congested. It was removed, though we well saw that it did not account for the acute symptoms. Some time later this man passed a ureteral calculus from what he felt sure was the *left* side.

The ureter is normally devoid of sensation, but the excruciating pain when a calculus becomes stuck in it is only too well known. The nerve supply of the ureter proper comes entirely from the autonomic system. Though, according to J. C. White, the ureter itself is said to have afferent nerves, one may well look for the least part of painful sensation in its very close connection with the peritoneum. It is well known to the surgeon who has to attack the ureter and looks for it by the extraperitoneal route, that when he lifts the peritoneum off from the underlying structures in the iliac fossa he always finds the ureter on the peritoneal side of the wound on account of the marked degree of attachment between ureter and peritoneum. In case of abnormally severe contraction of the ureter the overlying peritoneum is pulled on and such displacement is particularly painful. How far such an explanation of the pain in ureteral colic holds good is hard to decide. Stripping and freeing the ureter has brought about relief in cases of ureteral pain and colic, but was it not due to the separation from the closely adherent peritoneum? In catheterizing the ureter, pain is first felt by the patient on entering it as a bladder sensation. From then on there is no pain or sensation unless the catheter is inserted too far and impinges on the upper calix in the renal pelvis. The kidney pelvis has sensation, though the kidney parenchyma has none.

The microscope has shown that the nerve fibres of the autonomic system have no myelin sheath or at most a doubtful indication of such in the form of a faint stippling surrounding the fibres. A well developed myelin sheath is considered to be the attribute of somatic nerves. However, it has been observed that in the superior pelvic plexus about one-third of the fibres are sheathed with myelin. In the paravertebral sympathetic chain also have been found large myelinated neurones. This would mean that somatic sensory fibres run along in the track of nerves which are classed as belonging to the autonomic system. Indeed, this microscopic investigation followed the clinical observation of surgical relief from certain pelvic illnesses as

uncontrollable dysmenorrhea. The superior pelvic plexus, also called the presacral nerve, can be dissected out from between the shanks of the bifurcating aorta downward and this has given surprisingly good results in different pelvic troubles. My experience is limited to five cases, in all of which satisfactory results were obtained. In one instance it was not much more than an experiment, inasmuch as I had not read of such procedure for the condition with which we were confronted. On that account I will describe the case in short, though it really lies outside the subject of "abdominal pain." A woman, about fifty-five years old, was suffering from a pruritus vulvae which made her act like a maniac and drove the whole family to despair. With a distorted face she moved about excitedly and incessantly. Then at intervals she would suddenly stop and scratch herself violently amid groans. She had had local and general treatment by other doctors. Local injections by us were of no avail. As a last attempt we resected the superior pelvic plexus with not only immediate but perplexingly complete relief. There has been no sign of any return of the trouble since the operation which was done about six years ago.

Results with resection of the presacral nerve stimulated closer investigation. Learmont's studies made in common with Braasch are outstanding in this field. They observed that a crushing pain in the bladder was complained of on grasping the nerve. Learmont states that these afferent neurones run with the sympathetic nerve tracts and reach the spinal cord between the ninth dorsal and the fourth lumbar segments. These fibres conduct pain, but the mentioned authors found that after resection of the presacral nerve the sense of touch or pain in the bladder is not abolished but instead remains good on intravesical manipulation. Indeed, the relief from the bladder pain after resection of the presacral nerve was not complete. Though it is often difficult to be sure that all the fibres of the presacral nerve have been divided because it varies greatly in the distribution of fine lateral threads, Learmont came to the conclusion that much of the sensation, especially of the lower portions of the bladder, runs with the parasympathetic tracts which join the sacral nerves.

In summing up the observations on abdominal pain, emphasis must be given Lennander's findings that the parietal peritoneum is by far the

most sensitive structure in the abdomen and as it is supplied with somatic nerves, it gives us the most direct and most helpful information. Besides this there are myelinated sensory fibres running along autonomic tracts, though (because they are myelinated) they are considered as belonging to

the somatic system. In addition there are apparently afferent fibres in the sympathetic network which report trouble to the nearest sensory centers. Their messages, though often quite loud, are much less clear and definite than those of the somatic system.

EVOLUTION OF NEUROSURGERY

ALFRED W. ADSON, M.D.
Rochester, Minnesota

DURING the past twenty-five years I have had the privilege of observing and participating in the evolution of neurosurgery. The outstanding achievements in this period have been: (1) more accurate localization of lesions of the brain and spinal cord, (2) pathologic knowledge concerning the life cycle of neoplasms and inflammatory lesions of the central nervous system, and (3) the refinement of surgical methods dealing with lesions of the central nervous system, such as (a) selecting the proper anesthetics for the various procedures, (b) perfecting asepsis, (c) more accurately controlling bleeding, (d) simplifying craniotomy and laminectomy, (e) developing a better knowledge of intracranial pressure with control of surgical shock, and (f) developing surgical procedures in the treatment of lesions now included in the scope of neurosurgery.

The improvements in the localization of lesions involving the brain and the spinal cord have been due to many factors. The anatomic and physiologic knowledge of the central nervous system has been increased tremendously. Clinicians with the aid of the pathologist have come to understand, evaluate and distinguish lesions, thus selecting lesions that lend themselves to surgical treatment. The use of air or oxygen in studies of the ventricular system and the subarachnoid spaces has contributed much in the further localization of neoplasms. These studies are referred to as pneumo-encephalographic, ventriculographic and myelographic studies. Malformations of normal ventricles and subarachnoid spaces do not only indicate the position of the lesion but also are of value in determining the accessibility and the operability of neoplasms and abscesses.

From the Section on Neurosurgery, The Mayo Clinic.

Electro-encephalography is one of the newer diagnostic procedures employed in the differential diagnosis of cerebral lesions. It is of great value in distinguishing functional disorders from the organic disorders. This is especially true in the epileptic group. It is of moderate value in localizing neoplasms in the absence of increased intracranial pressure. As yet, the findings are too uncertain to be of surgical value in the presence of markedly increased intracranial pressure. The electro-encephalographic findings are also uncertain as a differential aid when the patient presents symptoms that might be attributed to a neoplasm, cerebral thrombosis, or a subdural hematoma. It is very possible that electro-encephalography will prove of greater value in the localization and the differential diagnosis of cerebral lesions as knowledge of abnormal brain waves increases.

The ophthalmologist plays no small part in the localization of cerebral neoplasms. The presence or absence of papilledema and other changes of the fundus with the numerous types of defects of the perimetric field contribute inestimable knowledge in the localization of cerebral lesions. The radiologist likewise contributes a large share in the differential diagnosis. The roentgenogram not only reveals the presence or absence of increased intracranial pressure but also reveals localized erosion and hyperostosis of the skull and vertebrae, which often assists in the localization and in the definition of the character of the lesion as well.

In the beginning of the specialty, some fifty years ago, little was known about the nature and the life cycle of cerebral neoplasms. Too often they were looked upon as inoperable lesions and all classed as gliomas. During these past twenty-

five years the pathologists have not only distinguished the various tumors, but they have also shown that the gliomas differ in character and rate of growth. Although many are rapid in their growth, others grow slowly. In order to illustrate this point, I wish to include the following four paragraphs prepared by our neuropathologist, Dr. James W. Kernohan, of the Mayo Clinic:

The contributions by neuropathologists or others working in the laboratories were almost wholly in the field of histology and were made possible by use of refinements in histologic technique and newer staining methods. Originally, all tumors of the nervous system were grouped together, but the encapsulated tumors were the earliest ones to be separated. These tumors were outside the substance of the brain and spinal cord and were recognized to be of two types; the first arose from nerve roots of the spinal cord and the eighth cranial nerve, and were called neurofibromas and later perineural fibroblastomas. The other group arose from the meninges and were referred to as dural endotheliomas. Mallory pointed out that the dura had no endothelium and that these tumors were meningeal fibroblastomas. However, there was some question as to their origin from the arachnoid cells, and Cushing adroitly avoided this controversy by calling them meningiomas. Later years have led to various subdivisions of these meningeal tumors by Bailey and Bucy, Globus, and still later, Cushing and Eisenhart.

Tumors of the pituitary body also were subdivided into the three types representing the three types of cells in the normal pituitary body, namely, chromophobe, eosinophil and basophil tumors. Being of epithelial origin and being, as a rule, slowly growing neoplasms, they have been called adenomas rather than carcinomas. Each produces a characteristic syndrome; however, the chromophobe adenomas are the ones most commonly requiring surgical intervention for relief of visual disturbances. Eosinophil adenomas produce the most characteristic syndrome of acromegaly, while basophil adenomas do not, as a rule, call for surgical intervention. Of the tumors in the neighborhood of the pituitary body, the most common type is the craniopharyngioma, although it has at times been called adamantoma, supracellar cyst, Rathke pouch cyst, and so forth. This tumor is most commonly seen in young adults, and since it usually contains calcium salts, it can frequently be visualized and diagnosed by roentgenography.

Many attempts had been made to subdivide the most common tumors of the brain, namely, the gliomas. It remained for Bailey and Cushing, in 1926, to subdivide this interesting group of tumors in a practical and useful manner. They based their work, to a considerable extent, on the excellent metallic impregnation methods of Cajal and his pupil, Del Rio Hortega. It also required a large number of tumors obtained at surgical operations for histologic study, which they correlated with carefully taken clinical histories. This excellent

contribution by Bailey and Cushing has remained the basis of all such studies since that time. Only very minor changes have been suggested, and some of these are perhaps unnecessary, being only refinements of the original contribution. This advance by Bailey and Cushing has been of great help to neurosurgeons since it allows them to vary the methods of surgical treatment, whether they employ radical procedures in the relatively benign, slowly growing types, with hope of prolonged, if not permanent cure, or a limited procedure in the highly malignant gliomas with rather hopeless prognosis. This subdividing of the gliomas has been the greatest single contribution which neuropathologists have made in aiding neurosurgeons.

There have been many other contributions of lesser or minor importance by which neuropathologists have aided in the advances made by neurosurgery, but it does not seem justifiable to enumerate them here.

Historical

Cranial surgery² dates back to the ancient Egyptians, Romans, and Peruvians, who trepanned skulls to give egress to the evil spirits within, but who also must have treated injuries of the skull if explanation is to be made of the extensive defects present in the skulls preserved in museums. Traumatic cranial surgery undoubtedly was practiced during the various epochs before modern antiseptic and aseptic surgery were introduced. Records show this was true during the Napoleonic wars. The depth of the surgical procedures was limited by the dura, as those who penetrated below the dura met with failures resulting from suppuration.

Richmond Godlee,⁴ of London, is accredited with being the first successfully to remove a tumor of the brain. The tumor had been localized by Bennett, who employed the newer neurologic methods. Godlee was able to accomplish the removal by employing Lister's antiseptic technique. The date of this operation was November 25, 1884, and the results of the procedure were reported in 1885. Ballance, in his monograph, "A Glimpse into the History of Surgery of the Brain,"⁵ stated that Heyman, in 1931, had removed a tumor of the parietal bone from a patient, eight years of age, who had Jacksonian convulsions. Other similar references are found in literature, but the reports differ from that of Godlee in that localized cranial signs, such as presentation of the tumor through the bone, led to the localization, rather than the neurologic symptoms which Bennett observed in localization of the growth. MacEwen, as early as 1876, had

diagnosed an abscess of the frontal lobe because of the contralateral hemiplegia and proposed operation which had been refused by the parents of the patient. Subsequently, the patient died, and MacEwen carried out the steps of his proposed operation at necropsy, and found the abscess. He too had operated on several tumors of the brain using lesions of the skull as localizing signs, before Godlee had operated in his famous case. However, MacEwen's report of abscess entitles him to be called the father¹⁰ of modern neurologic surgery. In the discussion of Godlee's paper, Ferrier reported a case in which tumor of the brain had been localized neurologically; Lister had trepanned but had failed to expose the tumor, but he did so eight days later at necropsy, when he found the tumor in the region explored. At the reading of Godlee's paper, Horsley also was present, and because of his interest in neurology and in the restriction of a surgical field to that of the central nervous system, it has made him the outstanding leader in the pioneer development of neurosurgery.

Weir, of Philadelphia, is accredited with being the first surgeon in the United States successfully to have removed a brain tumor. This operation was performed November 17, 1887, and was reported in 1888. In 1891, Keen reported five cases in which cerebral operations were performed. In the same year, C. H. Mayo^{11,12} reported two cases, the first of successful drainage of a brain abscess, and the second of ligation of a common carotid artery for an arteriovenous fistula in the cavernous sinus, with a successful result. Knapp, of Boston, in 1891 collected from the literature and reported forty-six cases in which operation had been performed in the preceding six years and stated that thirty patients had survived the operation, fifteen had died, and the fate of one had not been reported.

Keen, in 1895, commented on the fact that in spite of the rapid progress and brilliant achievement of modern antiseptic surgery, cerebral surgery had made but little advance until 1886, when Horsley and MacEwen introduced radical changes in surgical technique. He stressed the importance of disinfection and urged that the head be shaved a day before the operation, that it be well scrubbed with soap and water before applying ether and the 1:2,000 sublimate solution. He emphasized the importance of the precept that the surgeon's arms, hands and fingernails be thor-

oughly cleansed, and that the instruments and dressings be scrupulously clean. He referred to the Wagener-Wolfe osteoplastic flap, but advocated removal of the bone overlying a tumor by cutting the bone between the trephine openings. He closed the skin flap without replacing the bone until a secondary operation. The dura was closed with sutures of catgut and the skin with interrupted sutures of silkworm gut. The wound was covered with ample sterilized dressings which were kept in place by wet bandages covered by muslin bandages. In 1896, Keen presented another paper entitled "The Surgical Treatment of Intracranial Tumors," in which he reviewed the status of surgery of the brain. He complained of ineffective methods of localization of cerebral tumors and emphasized the importance of having the coöperation of a neurologist and an ophthalmologist in consultation. He believed that the roentgen rays, which had come into moderate use, should offer aid. In reviewing the various types of craniotomy, he stated that the Wagener-Wolfe method consisted of exploration by raising an osteoplastic flap over a circumscribed area. Horsley, in employing the osteoplastic flap, cut the bone between the four trephine openings with a straight saw. Krause changed this technique by employing a motor-driven circular saw, and Cryer employed a motor-driven circular osteotome in cutting the margins of the bone flap. Doyen advocated a more radical procedure, in that his osteoplastic flap amounted to hemicraniotomy. Keen said that if the tumor were small, the operation should be completed in one stage, but if it were large, it would be better to divide the operation into two stages. He advocated that Horsley's bone-wax be used for the control of venous bleeding along the cut margins of the skull, that the meningeal vessels be ligated and that only venous oozing be controlled by gauze packs.

Technique of Craniotomy

The technique of craniotomy as it is employed today has become a rather standard technique. One of two types is used. When a large area of the cerebral hemisphere is to be uncovered, the osteoplastic-flap craniotomy is employed. When a limited area is to be uncovered, or structures within the posterior fossa are to be explored, the decompression type of craniotomy is used. The osteoplastic-flap type of craniotomy consists in reflecting a portion of scalp with the

und
cles
held
tion
con
mus
rong

A
geo
ane
folle
pro
atot
dica
diur
is o
sho
tere
eth
The
ope
adm
of
fol
met
at v
sert
min
This
suff
use
anc
ven
oxy
trol

A
fact
stru
imp
sur
tra
infe

P
sur
men
It i
scri
of t
orri

JAN

underlying bone attached to the scalp and muscles in order that the bone may be replaced and held in position at the conclusion of the operation. The decompression type of craniotomy consists in reflecting or elevating the scalp and muscles for the removal of the bone with the rongeur, with no attempt to replace the bone that has been removed.

Anesthesia.—Neurosurgeons, like general surgeons, have experimented with various types of anesthetics. Those that are accepted today are as follows: Local anesthetics are used when limited procedures are employed, when patients are comatose, or when general anesthesia is contra-indicated. Intravenous anesthesia, pentothal sodium, may be used as an induction anesthetic and is of value in traumatic surgery when only a short anesthesia is indicated. Avertin, administered by rectum, supplemented with inhalation of ether, is preferred by a group of neurosurgeons. The anesthetic of choice for major neurosurgical operations, based on my own experience, is ether administered by inhalation. The technique consists of induction of anesthesia with nitrous oxide, followed by administration of ether by the drop method until the patient is thoroughly relaxed, at which time the Magill intratracheal tube is inserted. Anesthesia is maintained with ether, administered by the drop method on the open mask. This procedure permits an open airway without suffocation, an advantage which results in the use of a lesser amount of anesthesia, the avoidance of increasing the intracranial pressure by venous stasis and the facilitation of the use of oxygen in the event it becomes necessary in controlling surgical shock.

Asepsis.—Aseptic technique is an important factor in all surgical procedures performed on structures within closed cavities of the body. Its importance cannot be over-emphasized in neurosurgical operations, since structures of the central nervous system are extremely vulnerable to infection.

Hemostasis.—The achievements of cerebral surgery bear a direct relationship to the improvement in methods for the control of bleeding. It is amusing to review the literature which describes the means that surgeons in the early days of the specialty resorted to in the control of hemorrhage during craniotomy. Today, scalp bleed-

ing is controlled with a hemostatic clip. Few surgeons still employ the compression method by applying Kelley forceps to the galea. Bone bleeding is controlled by applying wax to the cut surfaces of the bone. The wax most universally used is prepared after the formula suggested by Horsley. Meningeal bleeding is readily controlled by silver clips which were introduced by Cushing. Silk ligatures employed for the larger vessels, whether arterial or venous, have continued to be extremely effective in controlling hemorrhages. Electrocoagulation has proved most effective and is a substitution for silver clips and ligatures for the control of smaller blood vessels in the scalp, muscles, dura and cortex. Electrocoagulation has added a valuable factor in the removal of encapsulated tumors, since it has made possible the removal of these tumors piecemeal through a very small opening; whereas previously these same tumors had to be considered as inoperable.

Elevation of Bone Flaps.—The technique of elevating bone flaps has likewise gone through a series of changes. The accepted procedure today consists of making several trephine openings at the margin of the proposed flap, after which the intervening bone areas are cut with a Gigli saw. The base of the flap is usually broken by elevating the peripheral margin of the flap. A variety of drills has been invented for the purpose of making the trephine openings. Osteotomes and skull plows have also been devised. However, when one takes into consideration the time factor necessary to adjust these various electric appliances, it becomes apparent that the bone flap can be elevated more quickly by the use of sharp cutting burs and a good steel saw than by the use of the various electric drills and saws.

Closure of Flap.—As neurosurgeons have become more interested in the removal of tumors than in the performance of a craniotomy, changes have been made from time to time in the selection of incisions and shapes of various osteoplastic flaps, in order to facilitate a more direct approach to the neoplasm. Fewer negative explorations result from the better localization of cerebral lesions. Though decompressions are still resorted to, precautions are taken to avoid cerebral herniations. In the event a decompression becomes necessary following an osteoplastic-flap

craniotomy, the bone is removed at the base of the flap over the temporal lobe, but the remaining portion of the bone flap is wired into place. In order to avoid cerebellar hernias, extreme care is taken to close the structures on anatomic planes with interrupted sutures of silk.

Control of Intracranial Pressure.—The control of intracranial pressure during a craniotomy has always been a perplexing problem. The aspiration of a dilated lateral ventricle invariably suffices. In the event the neoplasm is of such size as to have compressed the ventricles and subarachnoid spaces, hypertonic solutions of dextrose have been necessary as a rule to prevent disastrous results during the operation. However, with the use of the intratracheal tube in administering the anesthetic, the problem of controlling the increased intracranial pressure has been greatly minimized owing to the fact that venous congestion of the cerebral veins and sinuses has been markedly reduced because of the open airway afforded during the anesthetic.

Shock.—Surgical shock results from loss of blood at the operative site, loss of fluids, loss of proteins into the tissue, and exposure and trauma of the structures in the surgical field. The fall in blood pressure accelerates the phenomenon of shock and brings about a state of anoxemia. Thus it is the duty of the surgeon to operate expeditiously, maintain the fluid balance (supplementing blood or plasma if necessary), and administer oxygen along with the air during the anesthesia. Surgical shock is best controlled before it develops. If the craniotomy proposed is to be a major affair, it is wise to begin the intravenous infusion of physiologic salt solution and dextrose before blood pressures begin to recede.

Purpose of Craniotomy

Craniotomy originally was designed to resect or decompress cerebral neoplasms and to drain abscesses of the brain. However, today it also is employed to gain access to other diseased structures within the cranial cavity. Among the lesions that are being attacked in this manner are aneurysms of the cerebral vessels. The one most effectively controlled is the arteriovenous fistula between the internal carotid artery and the cavernous sinus, which gives rise to a pulsating in-

tracranial mass situated in the middle fossa and produces intracranial symptoms, a pulsating exophthalmos, oculomotor palsies and blindness. The treatment employed is the control of the arteriolar flow into the pulsating vascular mass, after having assured oneself that it is possible to obliterate the flow of blood through the internal carotid artery on the side of the lesions without producing a contralateral hemiparesis. Although it is possible in a number of cases to control the symptoms by ligating the internal carotid artery in the neck, neurosurgeons are frequently called upon to trap the arteriovenous fistula. This is done by ligating both the external and internal carotid arteries in the neck, followed by an intracranial ligation of the internal carotid artery on the cerebral side of the fistula before cerebral vessels are given off. In addition, I have found it necessary to obliterate the ophthalmic artery from within the cranium to prevent the reverse flow of arterial blood into the cavernous sinus through the arteriovenous fistula. I also have found it an advantage to do a venousectomy on the ophthalmic veins to reduce further the exophthalmos. Even though the ophthalmic artery has been ligated, in addition to the internal carotid, I have learned that the vision was preserved.

Aneurysms on other cerebral vessels have been resected. It must be borne in mind that such procedures cannot be carried out promiscuously unless there is the assurance of adequate collateral circulation. Arteriovenous varices of cerebral vessels occasionally are amenable to ligation and electrocoagulation.

Lobotomy

Lobotomy as a surgical procedure in the treatment of insanity represents one of the newer phases of neurosurgery. It was initiated by Moniz and brought to the fore by Freeman and Watts. The operation is now being performed by several neurosurgeons in various clinics. The operation is performed through a trephine opening over the premotor area and is designed to interrupt most of the fibers which pass between the frontal lobe and the midbrain. The object of the operation is to diminish the incoming impressions which give rise to the aberrations of mental reaction, characterized by disturbed mental states. Although the procedure is still in the investigative state, it does appear that certain

results have been accomplished. The two types of mental states most favorably affected are those of compulsion neurosis and involutional melancholia. Perhaps the postoperative interval is not of sufficient duration to evaluate the final results. One investigator made the comment that it was his opinion "that it made certain crazy individuals less crazy."

Premotor Resection

Premotor resection for Parkinson's disease is another one of the new neurosurgical operations. Klemme is the chief exponent of this procedure. According to his report on unilateral lesions, worth-while results have been accomplished. Unfortunately other surgeons have not been so successful. It is difficult at this time to evaluate the results accomplished. Since there are many sufferers of this disease, further investigation is justified. However, it should be borne in mind that a high morbidity accompanies the operative procedure.

Neuralgia

The major neuralgias, trigeminal neuralgia and glossopharyngeal neuralgia, have come to be known as distinct clinical entities. Each presents a definite syndrome. Palliative relief can be obtained in the treatment of trigeminal neuralgia by the injection of the peripheral branches with concentrated alcohol. This is not true in the treatment of glossopharyngeal neuralgia, since it is impossible to inject the ninth cranial nerve without injecting other nerves, such as the vagus, which lies in close proximity to the glossopharyngeal nerve. Peripheral avulsion as a surgical procedure in the treatment of trigeminal neuralgia has been abandoned with the exception of that of the ophthalmic branch, since the alcohol injection has proved more effective than the avulsion. Since both diseases are similar in characteristics, with the exception that they involve separate nerves, the attacks of pain will return unless the sensory component of each nerve is sectioned within the cranium. A resulting anesthesia must be accepted by the patient. The sensory root of the fifth cranial nerve may be subtotally or totally divided by either a transtemporal or a suboccipital approach. Although arguments are put forth to support the respective approaches, it appears that the transtemporal approach is the preferable one, since it is more universally em-

ployed by neurosurgeons. The unilateral, suboccipital approach to the ninth cranial nerve is the procedure employed in dividing this nerve in the treatment of glossopharyngeal neuralgia, since no other approach affords access to the intracranial portion of the nerve. In order to diminish the paresthesia that occasionally follows the section of the sensory component of the trigeminal nerve in elderly individuals, Sjöqvist devised and performed a tractotomy, sectioning the fibers of the fifth cranial nerve in the pons. Unfortunately, this operation did not achieve the objective for which it was designed, although it did relieve the trigeminal neuralgia. The postoperative sequela, which included cerebellar disturbance, limited the usefulness of the operation.

Subarachnoid Injection of Alcohol.—Subarachnoid injection of alcohol is a useful procedure in a limited number of painful conditions resulting from metastasis and herpes zoster. Unfortunately, there still exists a variety of neuralgias that are not amenable to surgical treatment, a fact which offers a challenge to investigators in this field. The more common ones are the so-called intercostal neuralgias, sphenopalatine neuralgias, and the multiple neuralgic pains that follow the extraction of teeth. Painful stumps and causalgias still present problems that are asking for solution. Occasionally, relief is obtained by the amputation of a neuroma and the injection of a nerve with alcohol. A sympathectomy offers some relief. Chordotomy, a procedure which is designed to section the spinal thalamic tract of the spinal cord in order to relieve painful sensation, has proved of value in the treatment of pain resulting from metastasis, but since subarachnoid injection of alcohol is a simpler procedure and is frequently effective in relieving pain, it has come to replace the major procedure to a great degree.

Tumors of the Spinal Cord

Tumors of the spinal cord occur much more frequently than was formerly thought. During the past twenty-five years, the neurologist has done much to elucidate the symptom complexes that result from the various types of intraspinal tumors which produce pressure on the spinal cord or invade it. The pathologist has likewise shown that most of these tumors are nonmalignant. He also has shown that the ependymal cell glioma arising from the filum terminale, does

not metastasize and that cures can be effected if it is completely removed.

Since 80 per cent of the intraspinal tumors are benign, their growth is slow, which accounts for the slow development of clinical symptoms. Tumors may be situated within the spinal canal, but extradurally. The largest group is situated within the dura, but extramedullary. The smallest group is situated within the spinal cord itself. The tumors most frequently arise from the meninges and nerve roots. They may arise from any of the structures within the spinal canal. When they are attached directly or indirectly to a nerve root, root pain is the first symptom to appear. As their growth proceeds, localized pressure and displacement of the spinal cord take place, which produce symptoms that indicate the nerve tracts involved. If the lesion is not recognized, the tumor may grow to such a size as to compress completely the spinal cord and produce the classic picture of transverse myelitis. This phenomenon helps to distinguish intraspinal tumors from inflammatory and degenerative processes. Spinal puncture, the elicitation of the presence or absence of spinal subarachnoid block, Queckenstedt test, as well as the radiologic study of the osseous structure of the spinal column, myelographic study and radiographic study of the opaque oil within the arachnoid space of the spinal canal are valuable adjuncts in making an accurate diagnosis. Thus it is obvious that the sooner a tumor is recognized and removed, the less damage it will do and the better will be the postoperative results.

Protrusion of Intervertebral Disks

Although protruded intervertebral disks are the result of injury to the annulus fibrosus with partial or complete prolapse of the nucleus pulposus, they have undoubtedly existed for all time but have only recently become recognized as a common cause for low back and sciatic pain. Occasionally, these lesions appear in other portions of the spinal column and produce symptoms not unlike those of an intraspinal, extradural tumor. Those that appear in the cervicodorsal region, which are second in frequency to those that occur in the lower lumbar region, are invariably the result of severe trauma. Again, the recognition of these lesions was originally due to myelographic studies. Lipiodol was the first opaque substance used to identify these lesions. It is still used, but since there is some question

as to the irritation it may produce, the oil is removed at the conclusion of the test. Air and oxygen and even helium have been substituted for lipiodol in the myelographic studies. More recently, a substance called pantopaque, which can be removed more readily than lipiodol, is being employed to localize and identify the lesion.

Undoubtedly, the occasional injury, with the resulting incomplete protrusion, heals spontaneously, but more often than not the symptoms recur. Surgical intervention then is necessary. Formerly the protruded mass was removed through a bilateral laminectomy; now we have learned that it can be removed through a limited unilateral laminectomy; and occasionally, as Doctor Love has suggested, it can be removed without a laminectomy after removing the hypertrophied ligamentum flavum that resulted from the original injury.

The question of whether or not a bone graft should be inserted at the time the protruded portion of the disk is removed has been a subject of much discussion. Inasmuch as we have had the opportunity of observing a large number of cases in which protruded disks were removed without fusion and with fusion, we have come to the conclusion that fusion should be combined with the removal of the protruded portion of the disk when there is present an anomaly of the lower lumbar vertebrae, such as sacralization of the fifth lumbar vertebra, malformations of the arch of the fifth lumbar vertebra, beginning spondylolisthesis and active hypertrophic arthritis.

Occasionally it is advisable to perform a combined operation when there is a history of long-standing static backache in addition to the symptoms produced by a protruded intervertebral disk. Furthermore, it occasionally is advisable to perform a combined operation on a patient who is a laborer, who is compelled to perform unusual, heavy work, such as one who handles freight or one who is a stone mason. The results achieved by operation are in direct proportion to the irreparable damage produced by the protrusion of the nucleus pulposus. They are inversely proportionate to the amount of industrial compensation and disability insurance sought by the individual.

Operations on Peripheral Nerves

Operations on the peripheral nerves were formerly limited to the repair of the injured nerve. Today their scope has extended to include

lesions of the sympathetic nervous system. It is generally accepted that the ideal repair of an injured nerve is an end-to-end anastomosis after resecting the neuroma. The apposition of the nerve ends is maintained by interrupted sutures of fine silk. The surgical field must be dry and free from sepsis. The ideal time to anastomose the nerve is six weeks after all evidence of infection has disappeared. Occasionally, one has to take advantage of flexion and adduction of extremities and even the transfer of nerves in order to bring about an approximation of the nerve ends. When it is impossible to bring the nerve ends together, autogenous cablegraphs or tubes of various substances have been employed to encourage the outward growth of axones. Unfortunately, the distance cannot be too great; if it is much more than a centimeter, cicatrical changes take place before the axones reach the distal portion of the nerve. If there is a preponderance of scar tissue, one should attempt to place the sutured portion of the nerve in a new muscle plane.

As the physiology of the sympathetic nervous system becomes better understood, it appears that vasoconstrictor impulses passing over gray rami are responsible for vasospastic disorders affecting the peripheral vessels of the extremities, which gives rise to such disease as Raynaud's disease and other peripheral vascular disorders that are aggravated by vasospasm. This being true, a variety of operations has been devised and employed to interrupt these impulses and thus relieve or ameliorate the symptoms produced by vasospasm.

Sympathectomy

The control of essential hypertension without renal involvement has likewise interested the neurosurgeon and prompted him to devise procedures for sectioning splanchnic nerves, including the two upper lumbar sympathetic ganglia on both sides, with the hope of interrupting the vaso-

constrictor impulse to a large vascular bed, thus creating a reservoir and a safety valve. This procedure is probably one of the steps in an attempt to control essential hypertension. The results justify the continuance of this procedure in select cases until such a time that an anti-hypertensive substance may be developed and given safely with effective results.

Summary

The object of this discussion has been to review some of the progress made in neurosurgery and to indicate the scope which it may include. I am aware of its limitations but am likewise aware that the specialty is still in its infancy. Surgical indications may be altered, procedures undoubtedly will change, new procedures will arise, and a more accurate selection of surgical lesions will be made with the hope that more will be achieved with each operation performed.

References

1. Adson, A. W.: Intradural tumors; surgical consideration. *Internat. Abstr. Surg.*, 67:225-237, (Sept.) 1938.
2. Adson, A. W.: The surgical consideration of brain tumors. *Northwestern Univ. Bull., Med. School*, 35:1-42, (Dec. 31) 1934.
3. Ballance, C. A.: A Glimpse into the History of the Surgery of the Brain. London: Macmillan and Co., 1922.
4. Bennett, A. H. and Godlee, R. J.: Quoted by Adson.²
5. Freeman, Walter, and Watts, J. W.: The radical treatment of psychoses and neuroses; alterations in personality following prefrontal lobotomy. *Dis. Nerv. System*, 3:6-15, (Jan.) 1942.
6. Keen, W. W.: Quoted by Dandy, W. E.: The brain. In, Lewis, Dean: Practice of Surgery, 12:Chp. 1, 1-682. Hagerstown, Maryland; W. F. Prior Co., 1942.
7. Keen, W. W.: Three successful cases of cerebral surgery; including (1) the removal of a large intracranial fibroma; (2) exsection of damaged brain tissue; and (3) exsection of the cerebral centre for the left hand; with remarks on the general technique of such operations. *Am. Jour. Med. Sci.*, 96:329-357; 452-465, 1888.
8. Knapp, A.: Quoted by Dandy, W. E.: The brain. In, Lewis, Dean: Practice of Surgery, 12:Chp. 1, 1-682. Hagerstown, Maryland; W. F. Prior Co., 1942.
9. Love, J. G.: Removal of protruded intervertebral disks without laminectomy. *Proc. Staff Meet., Mayo Clin.*, 14: 800, (Dec. 13) 1939.
10. MacEwen, William: On the surgery of the brain and spinal cord. *Med. News*, 53:169-175, (Aug. 18) 1888.
11. Mayo, C. H.: A contribution to cerebral surgery: I. Cerebral abscess; recovery. II. Arteriovenous aneurism in cavernous sinus; operation; recovery. *Northwest Lancet*, 11:59-60, 1891.
12. Mayo, C. H.: Quoted by Adson.²
13. Moniz, E.: Quoted by Freeman and Watts.⁵
14. Sjögqvist, O.: Studies on pain conduction in the trigeminal nerve; a contribution to the surgical treatment of facial pain. Helsingfors: Mercator's Tryckeri, 1938.
15. Weir, R. F. and Seguin, E. C.: Contribution to the diagnosis and surgical treatment of tumors of the cerebrum. *Am. Jour. Med. Sci.*, 96:25-38, 1888.

SIGNS OF MENTAL SICKNESS TAUGHT MILITARY POLICE

Teaching the military police to recognize signs of incipient mental and emotional sickness in able-bodied soldiers is one of the war aims of the National Committee for Mental Hygiene, Dr. George S. Stevenson, medical director of the committee, reported at its annual meeting in New York.

The M.P.'s and also Red Cross workers, physicians

in the armed services, company officers, chaplains, USO, Special Services (morale), and instructors are in a position, Dr. Stevenson said, to see the signs of an impending break in mental health and to see that the soldier gets special attention before he reaches the stage of serious mental sickness requiring hospitalization.—*Science News Letter*, December 5, 1942.

PROGRESS IN THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE UROGENITAL TRACT

GILBERT J. THOMAS, M.D.
Minneapolis, Minnesota

THE successful and continuous publication of a scientific magazine of the calibre of MINNESOTA MEDICINE for a period of twenty-five years is an accomplishment about which the members of the State Medical Association should be proud.

MINNESOTA MEDICINE was conceived during the period of our participation in the last World War. It flourished during this difficult period and now, after twenty-five years of successful publication, we find ourselves again confronted with the difficult job of publication during a total world-wide war.

The papers, monographs, case reports, and other scientific material appearing in this magazine are carefully selected and edited. They contain useful information for the general practitioner as well as the specialist. The editorials and news letters from the officers are informative and keep the busy practitioner enlightened concerning medical economies and other subjects that are related to the ethical practice of medicine. A glance at the abstract sections of some of our leading national magazines frequently reveals abstracts of selected articles that have been published in MINNESOTA MEDICINE.

The present editorial staff of the journal has done an excellent job. The work of editing, which is sometimes onerous and always time-consuming, receives little or no notice or commendation from the membership. I take this opportunity of personally congratulating Dr. Carl B. Drake and his staff.

My contribution to this Anniversary Number will deal with a short review of the progress that has been made in the diagnosis and treatment of a few medical and surgical conditions that arise in the urogenital tract.

One of my first papers published in MINNESOTA MEDICINE was concerned with renal infections. This paper contained data obtained during my attempt to classify the bacteria that were identified when cultures were made from infected urine specimens. One important fact that I learned during this clinical research was that cultures made from specimens of urine obtained at this time and for the purpose of this investiga-

tion were not always uncontaminated because instruments and ureteral catheters might not be completely disinfected or sterilized. One conclusion that I formulated was that the bacteria obtained by culture from one specimen of urine might contain secondary invaders and not the primary infecting organism. During the twenty-five years that have elapsed since my attempt to add something to our then incomplete information about bacterial causes of renal infections, great advances have been made not only in the more accurate diagnosis of the bacteriological cause of renal infection but in the treatment of this condition.

The first advance that speeded our ability to successfully cope with renal infection was the development of an improved sterile technique for obtaining specimens of urine for culture. The next advance was made by bacteriologists who were able to make accurate differential diagnoses of the type and strain of bacteria present after a careful study of the cultural characteristics of the bacteria they grew on various media from specimens of urine obtained with aseptic technique. This feat was particularly useful to the urologist and the clinician when differential diagnosis of the various strains of colon bacilli was accomplished. This was achieved by accurate observation of the behavior of colon bacilli in the production of gas and in the acid-alkaline reaction of culture media that contained sugars.

Another contribution to the control of and sometimes the cure of renal infections was the observation of the effect that change in the physical properties of the urine has on bacterial growth.

The surface tension of the urine was changed by the oral administration of certain drugs that were eliminated in great part in the urine. This physical change in the urine did produce bacteriostasis in many instances and a bactericidal action in many. However, this physical change was not always produced by the drugs used for this purpose and when it was, bacteria were not always killed.

Another advance was made in the successful

MINNESOTA MEDICINE

DISEASES OF UROGENITAL TRACT—THOMAS

control of renal infection when careful observation of the physical properties of the urine disclosed that certain bacteria were most often found in urine whose hydrogen ion concentration was high while other bacteria were found only when the reaction of the specimen was definitely acid and the hydrogen ion concentration was low. The physiological chemist and the bacteriologist working together have determined that some bacteria grow best in acid urine while others grow best in alkaline urine. Following this observation the urologist has been able to control, and sometimes eradicate, the growth of bacteria in the urine by changing the pH and the reaction of the urine by the oral administration of drugs and foods. Examples of the drugs used are mandelic acid, its various chemical combinations, and ammonium chloride and nitrate. The ketogenic diet, when properly composed by the dietitian and carefully followed by the patient, will produce physical changes in the urine that are bacteriostatic and sometimes bactericidal to most strains of colon bacilli. The production of a high pH of the urine so that it is very alkaline will cause bacteriostasis of the coccus group of bacteria, with some exceptions.

For many years all physicians used hexamethylenamine when any type of renal infection was present. The efficiency of this drug was improved when the pH of the urine was sufficiently changed to the acid side. This change in physical properties of the urine when hexamethylenamine is being used produced a breaking up of the chemical composition of this drug so that formaldehyde is free in the urine. This is the part of the drug that produces bactericidal action.

During the years that these observations were being made many urinary antiseptic drugs were manufactured, many of them from the coal tar dyes. The efficiency of these was based upon their effect on bacteria in a test tube. The clinical trials to determine the efficiency of these drugs as bactericidal agents acting in the tissues and fluids of the human body were and are disappointing. Occasional brilliant results were obtained but their mode of action is not well understood and the results obtained are not satisfactory.

When drugs were not completely effective some success was obtained in the treatment of severe renal infections when mild "shock therapy" was used. The stimulation of the reticulo-endothelial

system produced severe reactions and a few fatalities were reported, but this type of therapy did remove bacteria from the tissues of the kidneys and from the urine. Killed bacteria, particularly the typhoid bacillus, were and are being used for this purpose.

Chemotherapy in the form of the sulfonamide drugs constitutes the greatest advance that has been made in the treatment of renal infections. These drugs can be absorbed in sufficient concentration in the blood serum so that they control the foci that may constantly or intermittently infect the kidneys via the blood stream and in addition their accumulation and elimination in the urine is a factor that makes them ideal urinary antiseptics. Careful checks of the drug concentration in the blood serum and the urine provide a method of determining correct and efficient dosage and the chemical changes that may occur in the human body that make these drugs inert in certain individuals. Although the sulfa drugs are the best agents we now have for combating renal infections, the best results following their use will be obtained only if the physician knows how to use them. Volumes have been written regarding the chemotherapeutic uses of the sulfa drugs. The subject is a complex one and the clinical use of these drugs by the uninformed, inexperienced clinician may do harm when good was intended.

Beginning at about the time that *MINNESOTA MEDICINE* appeared on the horizon of medical publications, I became interested in the diagnosis and treatment of lesions of tuberculosis that were found in the urogenital tract. At the same time I was offered an opportunity to study tuberculosis at Glen Lake, the County Sanatorium for Hennepin County. Since my return from the last war, I have continuously carried on a clinical research at Glen Lake Sanatorium, which I believe has added something to the information that we then had concerning urogenital tuberculosis. The method of treating renal tuberculosis today is much different from that prescribed twenty-five years ago. The first bit of information that we obtained from our clinical research was and is that lesions of tuberculosis in the urogenital tract are local manifestations of a general disease. The disease tuberculosis starts in the chest cavity, most often in the lung, where the primary lesions are located. From here, spread of the disease occurs via the thoracic duct and then the blood

stream. When spread occurs in this manner, we have a generalized disease because bacteria or infected emboli may be carried by the blood stream to any organ or tissue in the body. When this fact was thoroughly established in our minds, we realized that lesions of tuberculosis found in the kidney or other urogenital organs must be tiny to begin with and do not all progress to destruction of the kidney and crippling of other urogenital organs.

When we realized that tuberculosis of the kidneys was a secondary lesion, a local manifestation of a general disease, and that infection may be present in the kidneys for a long period of time before symptoms are produced, our next step was to determine how many individuals who had pulmonary tuberculosis had clinical evidence of urogenital lesions. This led us to the routine examination of the urine of every patient in the Sanatorium who had an active lesion of tuberculosis. This examination revealed that 4.1 per cent of all patients with pulmonary or other lesions of tuberculosis had bacilli of tuberculosis in their urines or other clinical findings of this infection in the kidneys. The urological examination of patients who had cellular elements or bacilli of tuberculosis in their urines revealed that many had demonstrable small lesions in their kidneys that could be visualized on the pyelo-ureterograms without objective symptoms suggesting the presence of renal lesions of tuberculosis.

As our clinical research progressed, we began special pathological examinations of the material obtained at autopsy and following the surgical removal of kidneys. In addition, we began the examination of the viscera of a large number of guinea pigs that had been injected with the human strain of bacilli of tuberculosis. At about the time this part of our research was undertaken, Dr. E. M. Medlar published his observations concerning the pathology of tuberculosis of the kidney. This work established the fact that renal tuberculosis was hematogenous in origin and practically always bilateral and that certain lesions in the kidney might heal and that small lesions of tuberculosis could be present in the kidney without producing symptoms.

In 1917, tuberculosis of the kidney was not suspected until the patient had symptoms of bladder involvement such as frequency, painful or burning urination. Little or no attention was paid to the general condition of the patient, and all pa-

tients were submitted to surgical treatment unless active pulmonary lesions were present.

We are learning new things each day from our continued clinical research. We believe, however, that definite progress has been made in the diagnosis and treatment of renal tuberculosis during the last twenty-five years. I am quoting herein in the conclusions that I published in an article written for the International Congress of Urology. These contain some statements that suggest the advances that have been made in the diagnosis and treatment of renal tuberculosis.

"There is an early as well as a late stage of renal tuberculosis just as there is in any other type of tuberculous infection. This period may be symptomless, but a careful search will reveal clinical findings that are sufficient for a diagnosis.

"A study of the early lesions of renal tuberculosis must be undertaken while the patient is under treatment in a sanatorium. It is during the active stage of the original pulmonary or other lesions of tuberculosis that the kidney becomes infected and the early lesions develop.

"Any patient with pulmonary or other lesions of tuberculosis may have an unrecognized renal involvement (4.1 per cent in our series of cases). Repeated urinalyses, the injection of urinary sediment into animals, and complete urological studies should be made before a negative diagnosis is given.

"The route of spread of bacilli of tuberculosis from the chest cavity to the kidney is via the blood stream.

"A normal kidney does not eliminate bacilli of tuberculosis.

"The local renal lesion produced by bacilli of tuberculosis is not a local disease but a local manifestation of a general disease.

"The organs and tissues of the human body may develop resistance against the bacillus of tuberculosis that may be manifest in the kidney as well as elsewhere.

"The progress of lesions of tuberculosis of the kidney as well as elsewhere is slow.

"Tuberculosis of the kidney does not present a pathological picture different from tuberculosis of other organs. When one studies tuberculosis of other organs or tissues, this fact becomes apparent.

"Bilateral renal infection occurs in between 47-51 per cent of all patients who have urogenital tuberculosis (60-70 per cent during the invasion stage). Repeated examinations including bilateral pyelo-ureterograms are necessary to prove the absence of nondestructive tuberculous lesions in an apparently sound kidney.

"The primary focus of tuberculosis in the urogenital tract is most often the kidney. Early urogenital tuberculosis is usually a symptomless disease.

"Pyelo-ureterograms may show definite evidence of a pathological lesion in a kidney when the examination of the urine for bacilli of tuberculosis from this kidney is negative.

"Bilateral pyelo-ureterograms are major factors in

DISEASES OF UROGENITAL TRACT—THOMAS

making a positive diagnosis of renal tuberculosis in 27 per cent of instances. They are valuable in following the progress of destructive lesions.

"The finding of bacilli of tuberculosis in catheterized ureteral urine from one kidney does not in itself constitute an indication for nephrectomy even if the urine from the other kidney is negative.

"Treatment for every case of renal tuberculosis is both medical and surgical. How long the medical treatment should be instituted before surgical treatment is started depends entirely upon the condition present and the care with which the diagnosis has been made.

"Clinical and pyelographic evidence indicates that a nondestructive lesion of renal tuberculosis will heal. A patient with this type of lesion should have the advantage of sanatorium treatment to assist him in building up the necessary resistance against the destructive effect of the bacillus of tuberculosis.

"Before attempting the removal of one kidney known to contain a lesion of tuberculosis, be sure that the other kidney is sound and other lesions of tuberculosis are arrested. This may require months of observation and repeated animal inoculations of urinary sediment.

"Every patient who has submitted himself for surgical removal of a tuberculous kidney should have medical treatment following the surgical operation.

"The prevalence of renal tuberculosis is decreasing.

"The character of lesions of renal tuberculosis is changing."

During our investigation at Glen Lake Sanatorium, which was aimed primarily at the diagnoses and treatment of lesions in the kidney, it became necessary to examine the whole urogenital tract. A review of the data found in the reports of complete urological examinations and careful clinical examination and observation of our patients who had lesions in the genital tract changed some of the opinions that had been expressed by other observers concerning the route of invasion and the route of spread of tuberculosis to and in the urogenital tract.

In a paper published in MINNESOTA MEDICINE in May, 1940, we listed the following conclusions. Although some of these are not accepted by urologists generally, our continued observations support these conclusions.

"Tuberculosis of the genital tract is a local manifestation of a general disease and lesions here are most often secondary to a primary urinary tract infection in the kidney. The treatment plan of the local genital lesion or lesions must be based on this pathological fact.

"The route of spread from the kidney to the genital tract is most often via the urine.

"The primary lesion in the genital tract is most often the prostate gland. From here the infection may spread to the other genital organs. Foci of tuberculosis in the prostate gland may produce no symptoms.

"The seminal vesicle is infrequently infected with the bacilli of tuberculosis and is most always associated with lesions of tuberculosis in the prostate gland.

"Tuberculosis infection in the epididymis is secondary in the genital tract to tuberculosis in the prostate gland. There may be a subacute stage of tuberculosis of the epididymis which is activated by trauma.

"Treatment of lesions of tuberculosis in the genital tract consists of:

- (a) The location and arrest of other lesions of tuberculosis and of the primary focus in the urinary tract by whatever means are necessary.
- (b) Hygienic treatment of lesions of tuberculosis in the epididymis and heliotherapy to be followed by application of heat, incision and drainage, and surgical removal when indicated.
- (c) Orchidectomy is rarely necessary.
- (d) Hygienic treatment for tuberculosis of the prostate gland and seminal vesicles after removal or arrest of other active foci in the urogenital tract is always practiced. Surgical removal of these organs is seldom necessary.
- (e) Postoperative rest for three months is always essential."

One of the early articles published in MINNESOTA MEDICINE was concerned with the diagnosis and the treatment of hypertrophy of the prostate gland. This was written by a general practitioner in 1917 and was an excellent article. The author of this article asked that practitioners prepare their patients for surgical treatment by complete and prolonged drainage of the urinary bladder before they submitted them for surgical treatment for hypertrophy of the prostate gland. This writer did not discuss the merits or demerits of one or the other methods of surgical removal of the gland.

The progress that has been made in the treatment of this condition during these twenty-five years constitutes one of the most important contributions in the field of surgery. The first important forward step that was taken toward reduction of morbidity and mortality in the treatment of patients with prostate gland hypertrophy was the careful pre-operative appraisal of the patient's physical condition, particularly the function of the kidneys, heart muscle and vascular system. This was followed by the careful pre-operative preparation of patients preceding surgical treatment. This consisted primarily of drainage of the urinary tract via the bladder. Mortality and morbidity rates were reduced from approximately 25 to 5 per cent or less when urological surgeons began to apply pre-operative preparation.

DISEASES OF UROGENITAL TRACT—THOMAS

At this time there was still a lively controversy between the apostles of perineal and suprapubic prostatectomy. The pre-operative care, however, affected the mortality equally when one or the other of these surgical treatments was applied.

After the mortality rate associated with prostatic hypertrophy was reduced below 5 per cent, the makers of surgical instruments of precision for inspection of the bladder, added parts to these instruments so that transurethral resection of the prostate gland might be accomplished. Many different kinds of instruments were used and these were divided into two main groups: those that used a wire loop or round knife activated by means of a high voltage electrical current that would produce cutting in water, and those that used a round coring type of sharp steel knife that would remove sections of tissue when they were engaged in a fenestrum near the end of the sheath of the instrument. The currents used for cutting under water have been constantly improved and the instruments for using the activated loop have been so improved that the partial or complete removal of the prostate gland by this route has become the method of choice in the hands of many urologists.

Some conservative urologists who watched the constant lowering of the morbidity and mortality rates which occurred with improvement in the technique of pre-operative care of these patients, still adhere to the open method of surgical removal. They find certain types of enlargement and many patients whose general physical condition suggests that in their hands the patient would be more safely handled by open surgical removal. Most urologists have fitted the transurethral method of removing the prostate gland into their armamentarium, but do not remove all prostate glands in this way. Some urologists have so thoroughly mastered the technique of transurethral resection that all prostate gland hypertrophies are removed by them in this manner.

The transurethral or resection method has become the method of choice for removing the obstruction at the bladder neck associated with malignant changes in the prostate gland. There is no doubt that transurethral resection has permitted many patients to live in comfort and uri-

nate near normally for many more years than would have been their lot had a suprapubic drain been introduced and the prostate gland received no treatment.

A urologist has recently proved the relationship between malignant growths in the prostate gland and the gonads in the male. The use of male anti-gonad, or female gonad, or like chemical substances has controlled the progress of malignant growths in the prostate gland, has reduced the size of the metastatic growths, has improved the general condition of most patients and in many instances has relieved them of distressing pain, especially that from metastases that have involved the bones of the spine, the pelvis and the adjoining nerves. This gonad substance may be given by mouth.

Brilliant results have been obtained following the surgical removal of both testicles in the relief of pain produced by multiple metastases. Bilateral orchidectomy produces a break in the gonadal control of and the stimulating effect on the growth of certain cells found in all malignancies of the prostate gland that are gonad related.

The biochemists have isolated an enzyme that may be elaborated by gonad-related malignant cells that occur in the prostate gland and in bone metastases. The amount of this enzyme in excess of normal can be determined by analysis of the blood serum. Its presence in more than normal amounts suggests bone metastases and the blood level of this enzyme furnishes a gauge of the growth increase or recession of these metastatic lesions.

This advance in the treatment of carcinoma of the prostate gland has not produced cures of this fatal and crippling disease of older men. It has, however, produced some brilliant results in the relief of pain, improvement in the patient's general condition, and a definite change in the character of the malignant growth. If we remember that 25 to 30 per cent of all men who have symptoms of hypertrophy of the prostate gland have demonstrable malignant changes in their prostate glands, we can realize how important this advance in the treatment of this condition becomes.

Ferrets, apparently susceptible to the common cold, make good subjects for research.

PROGRESS IN ORTHOPEDIC SURGERY

MELVIN S. HENDERSON, M.D.
Rochester, Minnesota

IN the fifth to the tenth centuries, both crippled children and adults were neglected and abused; their plight was regarded as divine punishment and no sympathy or understanding was extended to them. The Renaissance slowly brought into being new thoughts and facts; social science gradually emerged into being in the seventeenth and eighteenth centuries. To her everlasting credit, England led the way in concluding that government owed something to the poor and unfortunate. At present, in our own State of Minnesota, provision for the care of the crippled child leaves little to be desired.

Orthopedic Facilities in Minnesota

The first number of *MINNESOTA MEDICINE* was published in January, 1918. The first original article in that issue was written by Drs. Arthur J. Gillette and Carl C. Chatterton. It dealt with the orthopedic treatment of deformities resulting from incurable paralysis. Dr. Arthur J. Gillette, pioneer Minnesota orthopedic surgeon, was president of the Minnesota State Medical Association that same year and his presidential address was published in the October, 1918, issue of *MINNESOTA MEDICINE*.

The history of orthopedic progress in Minnesota is closely interwoven with the life work of Arthur J. Gillette. Soon after his entrance into the ranks of the medical profession, Dr. Gillette decided to devote himself exclusively to orthopedic surgery. True to the orthopedic surgeon's unwritten code that the crippled child is his chief charge and responsibility, Dr. Gillette labored with never-lagging energy in that child's interests; in so doing, he placed Minnesota first among the commonwealths of the United States in recognizing its duty to the frequently forlorn and neglected crippled child. As his influence and prestige increased, Dr. Gillette never forgot that obligation and he brought more pressure to bear on his friends in the legislative body of the state to provide better care and educational facilities for the crippled child.

As early as 1897, Dr. Gillette appeared before

the legislators of the state appealing for state aid for the crippled child. Because of this appeal to the hearts of these men, and because they were swayed by the deep sincerity and earnestness of Dr. Gillette, he succeeded in awakening an interest in the problem of the indigent crippled child which has become traditional in that body and has never faded. There was no real precedent for this action and the legislators were treading on pioneer ground. In 1907, a grant was made to build a hospital for these children. The building was completed in 1911 and the children were transferred from the state owned ward at the City and County Hospital of Saint Paul (now Ancker Hospital) to their new home, the Minnesota State Hospital for Crippled and Indigent Children, located at Phalen Park. Dr. Gillette was the surgeon in charge until his far too early death on March 24, 1921, when he was but fifty-seven years of age. Soon after his death, the legislative body of the state changed the name of the hospital to The Gillette State Hospital for Crippled Children—a worthy tribute to its founder. Later was added Michael J. Dowling Memorial Hall, of which I shall say more later. The hospital is a comfortable, serviceable building of the one-story, pavilion type and is under the superintendence of Miss Elizabeth MacGregor. Dr. C. C. Chatterton is now the surgeon in charge. The hospital accommodates more than 250 patients, who receive the best services known to medicine and surgery.

The Shriners' Hospital for Crippled Children was built and opened in Minneapolis in 1923, on East River Road, adjacent to the Saint Paul city limits. Dr. Wallace Cole has been chief surgeon there since the founding of the hospital. This project reflects great credit on the "playground of Masonry," the Order of the Mystic Shrine; it supplies concrete evidence of an increased appreciation among men that social obligation must be recognized and met.

By the early and middle twenties the number of surgeons in Minnesota confining their work to orthopedic surgery gradually had increased. On September 30, 1924, at the home of Dr. Emil Geist, who died in 1933, the Minnesota Ortho-

From the Section on Orthopedic Surgery, The Mayo Clinic, Rochester, Minnesota.

ORTHOPEDIC SURGERY—HENDERSON

pedic Club was organized with Dr. Geist as its first president. Its purpose was to furnish a medium through which Minnesota surgeons who were interested in orthopedic surgery might exchange ideas. The members recognized their responsibilities to the public and provided physicians to conduct clinics, which were being organized about the state, to bring to light the crippled and arrange for their care. In 1934 the membership was opened to include orthopedic surgeons from the Dakotas and the name of the organization was changed to the Minnesota-Dakota Orthopedic Club.

In 1928 a significant event bearing on orthopedic surgery occurred at the University of Minnesota. Folwell said it was an event illustrative of "how a university whose primary function is to enlarge knowledge, including that of laws of health and the means of healing diseases may become the custodian and trustee of private endowments for charity." This statement was in reference to William Henry Eustis' gift of \$2,000,000 for the establishment of the "Minnesota Hospital and Home for Crippled Children."

A peep behind the curtain into the life of the donor is interesting. Born in New York State in 1847 of English lineage, William Henry Eustis, at the age of fifteen years was afflicted with disease of the hip joint and became crippled for life. However, his spirit was undaunted; he pursued his education, graduated in law and came to Minnesota in 1881 to practice. Later he was mayor of Minneapolis and he dealt so successfully in real estate that he amassed a fortune. His own affliction led to his deep understanding of the handicapped, crippled child. He never married, had no heirs or close kin and his lot must have been, in many ways, a lonely one. He decided to do all he could for crippled children and his magnanimous gift was the result.

November 10, 1928, the cornerstone of the Minnesota Hospital for Crippled Children was laid. Dr. Charles H. Mayo, of Rochester, was the principal speaker on this occasion and he remarked that William Henry Eustis would be honored forever, not only as a benefactor of children but also as a great contributor to education and scientific progress. "He thought," said Dr. Mayo, "of future education in Minnesota when he stipulated that this hospital, his gift to unfortunate children, should be located at the University, the center of education in the State."

Unfortunately Mr. Eustis was too ill to attend the ceremony and he died a few weeks later, on Thanksgiving Day. It was not long after this that the hospital became known as the Eustis Hospital for Children instead of by the name modestly suggested by the donor. At present this hospital, which is a wing of the University Hospitals, is used chiefly for teaching pediatrics—the words "crippled children," used in the original name of the hospital being employed in the broadest sense. This hospital, together with the facilities at the Gillette and Shriners' Hospitals, provides ample beds for both undergraduate and graduate teaching.

A few years previous to the time when Mr. Eustis made his gift to the University of Minnesota, he had turned over twenty-one acres of land on West River Road for the erection of the Michael J. Dowling school which was to be devoted to the care and education of crippled children. Public subscription of \$50,000 to this fund, and a like contribution made by the legislature, provided funds for erection of the building. It is maintained as part of the educational system of the city of Minneapolis.

Michael J. Dowling's name is used for two institutions in Minnesota: the school at the Gillette Hospital and the school for handicapped children in Minneapolis. Mr. Dowling had a colorful and successful career—an inspiration to all who are physically handicapped. When fourteen years of age, as a result of exposure in a severe blizzard in Yellow Medicine County, he lost both legs, one arm and part of the other hand. Undaunted he fought for an education and later owned, managed and edited a newspaper; following that he became a successful banker at Olivia, Minnesota. Mr. Dowling was elected to the legislature and became speaker of the House of Representatives. Following the war of 1914-1918 Mr. Dowling visited hospitals in both England and the United States, demonstrating what a man could do without limbs.

Graduate Training.—Three-year fellowships for graduate training in orthopedic surgery are maintained at the University Graduate School of Medicine in Minneapolis and also at the Mayo Foundation in Rochester. At the termination of this period of training, when a thesis has been written and accepted, and the fellow has successfully completed written and oral examinations,

ORTHOPEDIC SURGERY—HENDERSON

he receives his M.S. degree in orthopedic surgery. In the course of this three-year fellowship, each graduate student in orthopedic surgery in residence at the Mayo Foundation spends six months at Gillette State Hospital to obtain intensive training in the treatment of crippled children. In like manner, those fellows in residence at the University Graduate School of Medicine, in Minneapolis, come to the Mayo Foundation for six months or a year, for training in orthopedic diagnosis, particularly as applied to adults. A fellowship at the University of Minnesota is maintained through the gift of funds by the late Mr. and Mrs. H. S. Cole, parents of Dr. Wallace H. Cole.

In 1934, through the coöperation of the Section on Orthopedic Surgery of the American Medical Association, the American Orthopaedic Association and the American Academy of Orthopaedic Surgeons, the American Board of Orthopaedic Surgery, Inc., was organized. The purpose of the American Board of Orthopaedic Surgery is to improve the practice of orthopedic surgery by establishing certain standards of training and achievement which must be attained by candidates before they are declared diplomates of that board. Such a board has no legal right to prevent the practice of orthopedic surgery by physicians who are not diplomates of the board, but by its moral influence it has been a definite aid in keeping the practice of orthopedic surgery on a high plane. At the present time Minnesota has fourteen diplomates of the American Board of Orthopaedic Surgery, Inc., who are practicing in the state. Other specialties have similar boards and all are joined together in an advisory board of medical specialties.

Social Science in Orthopedic Surgery.—In 1935 the National Security Act, a recognized advance in social science, was passed and the responsibility for administration of the federal funds provided for crippled children was placed in the Children's Bureau of the United States Department of Labor. In 1936 the Division of Services for Crippled Children under the Minnesota State Board of Control was organized to administer the funds appropriated in Minnesota as an extension of existing services under the National Security Act. Gillette State Hospital, Eustis Hospital of the University and Shriners' Hospital were providing hospital services but ade-

quate follow-up services were lacking. Dr. Herman E. Hilleboe was appointed director and a system of follow-up and diagnostic clinics was organized about the state. When the hospitals above mentioned were overcrowded and a long waiting list existed, the bureau made arrangements for care of these waiting patients in hospitals in the Twin Cities, Duluth and Rochester, which had orthopedic surgeons on their staffs. In 1939 the Board of Control was eliminated by legislative action and its functions were assumed by the Department of Social Security of the State of Minnesota. The Division of Services for Crippled Children was then set up as a bureau in the medical unit of the Division of Social Welfare of the Department of Social Security and, as such, carries on today. It is functioning effectively now under the direction of Dr. Malvin J. Nydahl. The age limit of the crippled child treated under this plan has been raised to twenty-one years.

After the orthopedic surgeon has done everything possible for the cripple, he is usually requested to suggest some means by which the handicapped person can take his place in society and earn his own way. This raises the question of vocational adjustment and, by 1939, under the Social Security Act, assistance of this kind had been established in all forty-eight states, as well as in the Territories of Hawaii and Puerto Rico. Direct responsibility for the program is assigned to the State Boards of Vocational Education. To be eligible in Minnesota the applicant must be a resident of the state, sixteen years of age or older and have a permanent physical disability which results in a vocational handicap.

Thus we see that during the past twenty-five years Minnesota has lived up to her early history of interest in the care of indigent, crippled children and has provisions second to none for their welfare. We have every reason to be proud of this achievement.

Now what has orthopedic surgery contributed in twenty-five years to the campaigns against particular diseases?

The Orthopedic Attack on Certain Diseases

Tuberculosis.—In twenty-five years, the change in manner of practice of orthopedic surgery, and in the character and number of patients accepted for treatment, perhaps has been most outstand-

ORTHOPEDIC SURGERY—HENDERSON

ing in tuberculosis. The wards of orthopedic hospitals were formerly well filled with patients afflicted with tuberculosis of the bones and joints. At present, these cases are so rare that instructors in teaching institutions experience difficulty in finding patients to present to their students. We see less tuberculosis of all types; the sanatoriums of the country are no longer filled with patients with pulmonary tuberculosis; tuberculous glands of the neck are very seldom encountered and tuberculous peritonitis is very rare. The chief reasons are that better living conditions exist and open tuberculosis is recognized earlier; the dairy herds have been rid of the tuberculous cow and the milk in most towns and cities must be pasteurized. In private practice among orthopedic surgeons, very few patients with tuberculous joints are seen.

Poliomyelitis.—Infantile paralysis still takes its toll but in Minnesota during recent years the disease has not been attended by the high death rate it carried in some earlier epidemics. Comparison of the end results of treatment of this disease is very difficult because of the great variation in the types and degrees of paralysis in different epidemics. Since President Roosevelt allowed his name to be used, and the date of his birthday to be set aside as the occasion for raising funds to make possible research into the causes, effects and treatment of infantile paralysis, large sums have been accumulated. These funds have been too large to be used advantageously in research alone, so a large portion is left in the hands of local committees to be utilized in the care of persons afflicted with this disease.

There appeared on the scene in America a crusader from Australia with her own theories about the manner of treating patients afflicted with infantile paralysis. At first Miss Kenny (called Sister Kenny because all Australian nurses are given that title) was not understood but, undaunted and convinced of the value of the treatment, she continued her travel and finally came to Minnesota with a letter of introduction to the author. I had known of her work through friends in Australia and some of them, who formerly would not accept her theory, had reversed their opinions and they wrote, stating they were convinced of the value of her method and urging that her work be given thorough trial in America. Very few patients with acute infantile paralysis are seen in Rochester and that was the type of

patient Sister Kenny wished to treat and so demonstrate her method. My appeal to Dr. Wallace Cole to give Sister Kenny a hearing was granted and very shortly thereafter provisions were made by Drs. Cole and Knapp for Sister Kenny to begin her work at the University.

Previous to this time, little or no treatment usually was administered during the acute stages of infantile paralysis. Often serums, including human serum, were used but it was difficult to evaluate the results. Immediately following the patient's admission, Sister Kenny boldly treated the patients, irrespective of the degree of illness or pain. She systematically applied warm moist packs and she employed no splints or massage. Pain and spasm were relieved with astonishing promptness. If for no other reason than the relief of pain, Sister Kenny's method was an advance in the treatment of infantile paralysis. When the doubting ones examined the patients treated by Sister Kenny, for the early deformities occasionally encountered in this disease, they were not to be found. The Kenny method is established. Sister Kenny always has conducted her work under the supervision of the medical profession and she never has accepted for herself a fee for services. There can be no doubt of the integrity and honor of this public-spirited woman and Minnesota owes her a debt of gratitude. Sister Kenny, in return, freely acknowledges her debt to the National Foundation for Infantile Paralysis, the University of Minnesota, the city of Minneapolis and its public-spirited citizens. She is appreciative of the efforts of the men associated with her in Minneapolis, particularly of their scientific aid in attempting to clarify the terms she used and to explain the spasm in the affected muscles and other changes which she noted in the acute stages. The Center for Continuation Study at the University of Minnesota has arranged courses of instruction in the Kenny method and orthopedic surgeons, physical therapists and physical therapy technicians have come from all over the United States and Canada to attend these classes. Minnesota has taken the lead in this phase of orthopedic teaching.

Osteomyelitis.—A dread disease which frequently affects children is osteomyelitis. Teaching concerning its treatment has been modified. Formerly it was regarded as a primary disease of bone whereas very often the involvement of bone

is but an incident of general septicemia. Radical surgical treatment, by which a bone was opened wide to locate a small focus, frequently resulted in spreading the disease, and death. Many years ago a young orthopedic surgeon boldly challenged his chief's radical methods by putting his patients in casts and at rest and, strangely enough, his results were excellent and fewer children died. Sad to say, however, it cost him his position on the staff of that hospital. Now it is generally recognized that in these cases surgical methods must be very conservative. If operation is carried out, provision should be made for wide drainage by a vaseline pack and fixation in a cast, according to the method of H. Winnett Orr of Lincoln, Nebraska. In chronic cases, the same method is used but it must be preceded by meticulous surgical care in that all sequestra, infected pockets and sinuses must be cleaned thoroughly.

Sulfonamides were introduced into this country about 1937 and since that time they have been used extensively for many conditions including osteomyelitis. Prontosil was the first drug in this line to be used in this country; then came sulfanilamide, sulfathiazole, sulfadiazine and others. Sulfanilamide is considered the most effective in the treatment of streptococcal infections while sulfathiazole is thought best for staphylococcal infections. These drugs are not particularly effective after suppuration has become extensive. Undoubtedly, however, many lives have been saved in those cases in which the blood cultures have been positive. Last winter, for the first time, I saw an adult patient recover from staphylococcal septicemia complicated by osteomyelitis of the femur. I am confident sulfathiazole saved his life.

Ununited Fractures.—Orthopedic surgeons are called on to treat ununited fractures. Frequently such fractures are compound and infection has taken place—the result of severe, crushing types of trauma. After long months of waiting for the infection to subside (frequently a year or more after all drainage has ceased) a bone grafting operation may be undertaken. Although the technical steps of the operation may be adequately

carried out, the old infection may flare up and the work be lost. Sulfonamides have enabled us to perform these hazardous operations with a much lower rate of infection. Before operation, the patient is given the drug by mouth until the concentration of the drug in the blood is at the desired point; before the wound is closed at the completion of the operation the surface of all tissues is covered carefully with a thin layer of the sterilized, powdered drug that has been selected. After surgical operation, the concentration of the drug in the blood should be observed for at least a week to insure maintenance of an adequate concentration. Administration of these drugs is not without peril; patients with injured kidneys do not tolerate them well and, if the leukocyte count goes much below normal, administration of the drug should be discontinued. There is no doubt of their value in the treatment of infected wounds of all types but sound surgery should at all times be the master of the situation.

The Recent Past and the Future Need

Twenty-five years is a quarter of a century and during that span of time many changes occur and much progress is made. Other conditions in the field of orthopedic surgery have improved but they are too numerous to be mentioned at this time.

Social advances have been made in care of the crippled child but we are still found wanting in similar care of the adult. The handicapped person now has the opportunity of training for a line of work which will enable him to be self-supporting. Changes, as mentioned, occur in the type and frequency of certain diseases. What the world needs more than anything else at present is a type of mental hygiene which will sweep aside and segregate the evil-mindedness of such men as Hitler, Mussolini, Hirohito and their ilk. Only thus can be prevented such world catastrophes as we are now experiencing. Let us pray that the next twenty-five years will see this accomplished.

References

1. Folwell, W. W.: A history of Minnesota. Saint Paul; Minnesota, Historical Society, Volume 6; 122, 1930.
2. Gillette, A. J., and Chatterton, C. C.: The orthopedic treatment of deformities resulting from incurable paralysis. Minnesota Med., 1:1-5, (Jan.) 1918.

A method of producing lactic acid from grapefruit juice, using discarded fruit, has been patented by two chemists of the U. S. Department of Agriculture.

THE PROGRESS OF OBSTETRICS DURING THE PAST TWENTY-FIVE YEARS

W. A. COVENTRY, M.D.
Duluth, Minnesota

A REVIEW of the progress of obstetrics in Minnesota during the past twenty-five years is best revealed by the very marked decrease in maternal and fetal death rates during that period.

Thus it will be seen that Minnesota has for twenty-five years had a favorable maternal death rate as compared to the national rate. It also shows that the rate today is one of the lowest, if not the lowest, of any state in the Union.

This most favorable report has not just happened. It is the result of many factors, largely brought about by, first, a program of education fostered by the Children's Bureau at Washington, by the efforts of the State Board of Health and our own teachers in the University of Minnesota, and last, but not least, by the untiring efforts of the obstetricians of this state who have campaigned in many and devious, but arduous ways, to make studies of the main causes of maternal deaths, and set out to teach and preach how these difficulties may be overcome.

The main causes of maternal death fall under four main headings: hemorrhage, sepsis, toxemias, and a miscellaneous group. In the prevention of hemorrhage, there has been less progress made than for any other cause, largely because there are so many extrinsic factors involved. The rate in Minnesota for maternal deaths from hemorrhage has not decreased, while from sepsis the rate has fallen from 1.8 in 1922 to 0.53 in 1940. In toxemic conditions, the rate fell from 1.10 per cent to 0.47 per cent in a corresponding period of time and in the group of miscellaneous causes, a decrease of 66 per cent is noted, showing a much better rate in Minnesota than in the United States at large.

Probably one of the greatest advances in maternity during the past twenty-five years has been the persistent stressing of and insistence on prenatal care, such prenatal care to begin as soon as possible after conception. So great have been the results from this campaign that now it is a rarity to find a pregnant patient who is not under the observation of a physician throughout her en-

From the Department of Surgery, Gynecology and Obstetrics.
The Duluth Clinic, Duluth, Minnesota.

MATERNAL DEATH RATE

Year	Minnesota	U. S. Bureau Rate Average of All States
1915	5.2	6.1
1920	6.2	8.0
1925	5.2	6.5
1930	5.4	6.7
1935	4.7	5.8
1940	2.2	3.7
1941	2.0	Not available

tire pregnancy and a rarity to find a physician in this state who does not insist on prenatal care for at least the essentials of a complete physical examination including a Wassermann and pelvic measurements followed by monthly or semi-monthly examination of urine, blood pressure, blood, and the weight of the patient. Not only have these examinations been of inestimable value to the patient, but they have made the physician more alert and more eager to diagnose impending dangers of hemorrhage, malposition, toxemia, severe anemia, et cetera, which when early discovered make it possible to do much to avert impending trouble for mother and fetus.

Twenty-five years ago sepsis accounted for more maternal deaths than any other one cause. Now it is at the bottom of the list. The advent of the gloved hand, the disapproval of vaginal examination under any than the most careful aseptic technique, and the great increase in the number of hospitalized obstetrical patients, all have been a great help in lowering this rate. The advent of finger rectal examinations during the progress of labor makes it a rarity to do a vaginal during this stage of labor. The free use of soap and water has been a great help. Much has been done during the past twenty-five years toward the use of vaginal antiseptics. All types of germicides have been advocated and used. The relative merits of the various antiseptics leaves room for much discussion, but, in any event, it has taught the obstetrician to respect the possibilities of infection via the vaginal route.

I believe the lowered incidence of, and the education directed toward prevention and cure

OBSTETRICS—COVENTRY

of venereal diseases during these twenty-five years has had much to do in the prevention of puerperal sepsis. A postpartum neisserian pelvic infection has almost disappeared from the picture.

Toxemic conditions have decreased 60 per cent during the past twenty-five years, as the result of much intensive investigation in the world's obstetrical centers and the teachings of our schools. Incorporated in the value of prenatal examinations is the early recognition and differentiation of nephritic conditions from true toxemic conditions and eclampsia, the interpretation of the value of urine tests, examination of eyegrounds, blood pressure levels, edema, and weight increases, especially in the later months of pregnancy, and the determination of avenues of treatment not only to save the baby, but also to prevent damage to the mother's kidneys, blood vessels and liver that might otherwise result in permanent insult to these organs. Although future investigations will undoubtedly clear up many of the theories now advanced as to the causes of toxemia, there is at present much to be learned for future generations.

This progress made in the lowering and prevention of maternal deaths has also had a most favorable effect on the lowering of the fetal death rate both stillborn and newborn.

It might be well to review a few of the new methods of treatment of the obstetrical patient that have come to stay or the old ones that have gone for good during the past twenty-five years. These remarks may have a personal slant, but take them for what you think they are worth.

1. In considering measures to alleviate pain during labor, the barbiturates should receive chief mention. Such a wave of enthusiasm, never, in my humble opinion, has entered the obstetrical field in a given time as in the era of barbiturates for the relief of labor pains or for "painless labor." The number of drugs and their method of use, their sane and insane use, the effects upon mother and newborn, the necessity for hospital care and nurses to properly supervise these medications—well, volumes have been written by all kinds of enthusiasts, and now I think we can see the near decline of the barbiturates in the management of the first stage of labor. There are still some "old-timers," and their number is increasing, who believe that small doses of morphine properly administered can give a patient better rest than any barbiturate. There will be a rever-

sion to the age-old fact that our forbears took no drugs at all and soon after delivery forgot that there were labor pains. There was no exhaustive lay literature for them to read and give them the impression that labor was a painless effort. Old Dame Nature, I believe, did not intend it that way.

2. Cesarean section twenty-five years ago was considered a very major operation; it was done usually as a last resort and there was a resultant high mortality rate. The improvements in surgical technique, together with a desire for surgery, I believe, caused a wave of enthusiasm for cesarean section about ten years ago, wherein there arose in the minds of some good obstetricians too many indications for this operation which still has surgical dangers. It seems to me that with the advent of more diagnostic aids in x-ray pelvimetry, more skill in the diagnosis of placenta previa, that cesarean section gradually is finding its place in rational obstetrics. The types of low cesarean section that have been developed have certainly helped in lowering the morbidity and mortality rate from this operation.

3. There have been new types of anesthesia introduced within the past twenty-five years such as rectal, spinal and many new gas anesthetics and more recently, intravenous anesthesia. Many distinct advances have been made in the administration of anesthesia which have added much to the comfort of the patient in labor. The old, but yet very good, chloroform seems to have been relegated almost to the curiosities of the delivery room. I predict that soon some type of anesthesia easily administered, without harmful effect to the baby, but still very effective in relieving pain for the mother without retarding labor, will be found.

4. New techniques in x-ray pelvimetry have made great advances in the proper interpretation of pelvic measurements and the relationship of the fetal head to the pelvic inlet. There has also been a great advance in soft x-ray technique in determining the site of the placenta in the pregnant uterus.

5. Vitamins have a decided place in obstetrics, but the age in which we live with radio, advertising, propaganda and zealous enthusiasts have made for an easily led Mr. Public. We are on the wave now, and have been for the last five years; possibly we are on the crest of the wave—who can predict? Each for himself. My pre-

dition is that on the other side of the crest of this wave such a distinct recession will occur that Mr. Average Public will gasp for breath when he finds that the millenium was just a mirage.

6. The current and increasing use of episiotomy has been a great advance in obstetrical technique. It certainly eases the second stage, shortens labor, but most of all it protects the outlet of the vagina from many future cystocele, rectocele and prolapses and prevents many weakened perineums. Painstaking suturing and more accurate repair of incised or torn perineal parts have insured much in the way of permanent results. Perineal injuries and their end-results are becoming more uncommon in the gynecological field.

7. Better obstetrical teaching in our medical schools and the virtual insistence on delivery by natural methods, so firmly impressed in our own medical school, have relegated the high forceps operation to a thing of the past.

8. The technique of version as so ably taught by Dr. Irving Potter of Buffalo, New York, has been an epochal advance when version is indicated. True, we cannot believe the indications are so many as advocated by the master; still, the technique is masterful.

9. The development of the field of pediatrics within the past twenty-five years and its relationship with obstetrics has been of the greatest advantage in decreasing the newborn death rate and insuring much healthier babies.

10. Much has been learned within the past twenty-five years regarding the care of the mother postpartum. The value of movements and exercise in restoring the muscular tone of not only voluntary but involuntary muscles has made for a more rapid return to involution of all organs involved in the pregnant state. The papoose days may not be so far distant.

11. The value of postnatal examinations with office repair and correction of minor postpartum

complaints is being stressed and is almost a final chapter in restoring our good patient to her normal self.

All this progress during the past twenty-five years has not just happened by a process of evolution. The efforts and interest put forth by Public Health Workers, as exemplified in the federal monies furnished the State of Minnesota through the State Board of Health and the University in conjunction with willing obstetricians, have made it possible to go out to certain centers in the state and to preach and teach better obstetrical care.

This interest among obstetricians has stimulated the formation of obstetrical societies such as the Central Association of Obstetricians—the organizers being leaders in our state in obstetrical matters; the progressives, who, not for gain but for mankind and womankind, have endeavored to learn more for themselves and to pass so freely their knowledge on to others. They have organized other "within the state" groups all for the same reason—to pass on to others their knowledge about the pregnant woman.

This great University of the State of Minnesota, through its teachers and more especially the Center for Continuation Study, by bringing all those interested in obstetrical knowledge under their roof, has added its mite to advancing obstetrical knowledge.

I have endeavored to avoid personal references but I can't resist the mentioning of Dr. Jennings C. Litzenberg, emeritus Professor of Obstetrics of the University of Minnesota, for his epochal teaching of conservative, sound and sane obstetrics and his many contributions to that field during the last twenty-five years.

All the aforementioned influences—desire for knowledge, free-will offerings of services, sound teachings—have their place. The State of Minnesota is among the states in the lowest brackets of the maternal death rate of the nation.

HANDS UNIMPORTANT IN SPREAD OF "FLU"

Discovery that the influenza viruses type A and type B die in a few minutes if put on human skin, such as the palm of the hand, and allowed to dry there, was announced by Commander Albert Paul Krueger, in command of Naval Laboratory Research Unit No. 1 at the University of California.

"Virus solutions so strong that a teaspoonful would kill half a billion mice lost all disease-producing capacity

within 10 minutes," Commander Krueger, formerly professor of bacteriology at the university, stated.

"These results emphasize again the importance of tiny virus-containing droplets sprayed into the air when one sneezes, coughs or even talks vigorously, as a means of spreading influenza. Hand to hand distribution of the virus and eventual hand to mouth transfer would appear to be unimportant hazards."—*Science News Letter*, December 5, 1942.

ADVANCES IN RADIOLOGY IN THE PAST QUARTER-CENTURY

R. G. ALLISON, M.D.
Minneapolis, Minnesota

RADIOLOGY has advanced more rapidly than any other branch of medicine in the past twenty-five years. This advancement first occurred in revolutionary changes in apparatus. Once these improved machines and materials were available, diagnoses began to improve by leaps and bounds.

There are perhaps two reasons for this rapid advancement which began at the time of World War I. First, the specialty itself was relatively young, but most important was the necessity for new, easily transportable and efficient x-ray apparatus for our troops in France. One has only to reflect on the gas tubes, glass plates, mechanical rectification and even mercury interruptors commonly in use at that time. War called for more efficient apparatus, and the inventors and manufacturers responded in a manner that gave us more improvements during the year 1917 than had been made in all the years since Roentgen announced his discovery.

Dr. W. D. Coolidge, who in 1912 developed the x-ray tube which bears his name, in 1917 developed a self-rectifying tube. This contribution of his made it possible for the manufacturers to develop a compact portable machine to energize this tube. This made bedside x-ray work possible and made it practical to treat fractures successfully by skeletal traction without moving the patient to obtain plates. The manufacturers utilizing this self-rectifying tube were able to construct a similar x-ray for use in the field hospitals, the source of the current being a self-contained gasoline engine. Those two types of machines did 90 per cent of the x-ray work done in the American Expeditionary Forces.

The Eastman Company, in this same summer of 1917, developed an extremely satisfactory x-ray film which gave beautiful detail, was easy to transport, develop and store, and could be transported with the wounded soldiers and their records without danger of breakage.

A few years after the World War, Dr. Hollis E. Potter of Chicago perfected the movable grid which bears his name and the name of the original inventor, Dr. Gustav Bucky. This apparatus enabled the radiologist to obtain radiographs

showing beautiful detail in areas previously inaccessible owing to the secondary radiation set up in the body of the patient with consequent blurring of detail. This apparatus was the second great invention since Roentgen's time, the first being the Coolidge tube. While all of these machines and apparatus have been further improved upon, they stand today as the basis upon which all subsequent apparatus has been modeled.

The next basic invention was the planograph developed a few years ago. This apparatus, as you know, was developed in order to enable the radiologist to go after one particular area of the body and obliterate all other detail on the plate. Thus it is possible with this apparatus to show perfect detail of the sternum without the superimposed shadow of the spine, ribs and lungs. Any given portion of a vertebra can be shown without superimposed shadows of other portions of the same vertebra. Laryngeal cords and tumors can be clearly delineated. It is applicable to every portion of the body. So far its greatest value has been in diseases of the chest. Here the absence or presence of pulmonary cavity or tumor may be clearly shown even in the presence of large pleural effusions or in chronically thickened pleura which on the ordinary chest film would obscure detail of any underlying stricture.

This method is still not widely used and will not be until the end of this present war enables the manufacturers to further perfect it. However, many radiologists with the use of "home-made" apparatus have done excellent work by employing this method.

Having now mentioned these basic inventions in apparatus developed in the past twenty-five years, let us consider some of the chemical and physical media which have been brought forth as diagnostic aids and agents in the same period of time.

Dandy of Johns Hopkins, in 1918, developed ventriculography. This has done much to clarify the diagnosis of intracranial new growths as well as to help to differentiate them from the early and late effects of traumatic lesions.

Forestier of France, in 1922, developed lipiodol. This oil can be safely introduced into the bron-

chi, the uterus, the nasal accessory sinuses, and the spinal canal. The diagnosis of pathological conditions in these areas has been made infinitely easier and more accurate by the use of this oil. It is the only method by which prolapsed inter-vertebral disc can be visualized and localized. After the diagnosis has been made the oil can then all be withdrawn through the same needle through which it was introduced.

Cole and Graham of St. Louis, in 1924, developed a gall-bladder dye which has made the diagnosis of pathologically functioning gall bladders, with or without stones, extremely accurate.

Swick, in 1928, developed an intravenous kidney dye which has proven to be an outstanding agent in the diagnosis of injuries and diseases of the urinary system. By the use of this method the urologist has been able to avoid much cystoscopy. He has further been able to obtain much information not obtainable by retrograde pyelograms. This method is invaluable in the diagnosis of hydronephrosis. By its use non-opaque stones can be recognized with a high degree of accuracy. Opaque stones can be localized and differentiated from other conditions casting similar shadows on the routine plate. Used in connection with cystoscopy and retrograde pyelograms it should leave few diseases of the urinary tract undiagnosed. It is by far the most valuable and often the only method of recognizing some of the congenital abnormalities of the urinary tract.

Diseases of the Chest

Although as early as 1906 Williams of Boston had written extensively on the fluoroscopic diagnosis of cardiac and pulmonary lesions, his work attracted little attention.

Lewis Gregory Cole of New York City had, as early as 1907, made a plea for the use of x-ray plates in the diagnosis of tuberculosis. Again, in 1910, he classified the changes produced by pulmonary tuberculosis on the x-ray plates. His information had been obtained in the morgue at Bellevue Hospital. Here he radiographed hundreds of chests post mortem and correlated his findings on the plate with the autopsy findings.

In 1911, Kenyon Dunham of Cincinnati carried the work of Cole still further with serial microscopic section studies of both normal and pathological lungs. Dr. Cole and Dr. Dunham, by 1912, had interested the Saranac Lake men in the x-ray diagnosis of chest conditions. It was my privilege to enter on my two-year service in

1912 simultaneously with the advent of their first x-ray machine. Even the enthusiasm of the Saranac staff made little impression upon the world at large. Many inquiring workers, however, came to Saranac in those early years between 1912 and 1917 and became converts to the x-ray method of diagnosis.

When World War I began for us in 1917, Dr. Cole and Dr. Lawrason Brown made many futile attempts to interest the Surgeon General's office in obtaining a single chest plate of each army recruit. When this was refused they obtained funds from the health department of New York State and made stereoscopic plates of a National Guard Regiment in New York City. They found 10 per cent of the 2,000 men examined to have definite parenchymal tuberculosis. Even with these published facts the Surgeon General's office refused to do anything further in regard to x-raying the chests of recruits. I might add, however, that the Surgeon General's office was guided in their decision by the advice of both civilian radiologists and civilian internists who still felt the method was without value. It was not until the several hundred young radiologists who were trained in the army School of Radiology began to make their influence felt that the x-ray diagnosis of tuberculosis began to be generally accepted. The influenza epidemic of 1918 furnished a fruitful field for their endeavors. The portable bedside x-ray machine invented that year made routine plates easy to obtain. The radiologists found ardent allies in the pathologists during this epidemic and gradually the value of this method began to be forced down the throats of the ward surgeons and physicians. When the war ended the x-ray diagnosis of tuberculosis was at last firmly established twelve years after Cole had written his first article on the subject based on a comparison of post mortem x-ray findings as compared with autopsy findings.

I regret that Lawrason Brown did not live to see his stand in 1917 vindicated. It must be a source of satisfaction to Dr. Cole to see his recommendation to the Surgeon General of the army accepted in full twenty-five years later.

The late Willis Manges of Philadelphia, in 1922, made a classic observation in his description of the x-ray findings in non-opaque foreign bodies in the air passages. He found that non-opaque foreign bodies produced either obstructive emphysema or atelectasis on the affected

side. This is particularly well shown on plates made in different phases of respiration. As a result of Manges' work it became immediately apparent that primary bronchial carcinoma gave identical findings and thus early primary new growths of the lung began to be recognized.

Bone Pathology and Injury

Much good work had been done on the x-ray diagnosis of bone diseases prior to 1917, chiefly by German workers, notably Alban Koehler.

It was not until 1921 that an excellent English text appeared on the subject. In that year, Dr. F. H. Baetjer and Dr. C. A. Waters of the Department of Radiology of Johns Hopkins University published their textbook entitled "Diseases and Injuries of the Bones and Joints." This text, written primarily for the medical student, was of far greater aid to most radiologists than its modest authors would admit. It remained the standard work in this country until the English edition of Koehler's work appeared in 1929. Baetjer and Waters were, however, the pathfinders in the diagnosis of bone diseases. The basic principles brought out by them furnished the ground work for all the work which has since been done in bone pathology.

Gastro-Intestinal Tract

The x-ray diagnosis of diseases of the gastro-intestinal tract was resting on a sound foundation prior to 1917. Most of the pathologic conditions encountered therein had been described before that time.

Akerlund, in 1921, published his work on duodenal ulcer. He was the first to call attention to the visualization of an ulcer crater on the posterior wall of the cap, and visible only when localized pressure was applied over the cap during the fluoroscopic and plate examination.

Lawrason Brown and Homer Sampson of Saranac Lake, in 1926, published a monograph on intestinal tuberculosis and accurately described the x-ray findings in both the hypertrophic and ulcerative types of this disease.

X-Ray Treatment

The x-ray was employed in the treatment of diseases of the skin within a year after the Roent-

gen discovery. Pusey of Chicago and Caldwell of New York published a small treatise on the subject in 1898.

Little progress, however, was made in x-ray treatment until the period immediately following the World War. Coolidge at that time developed an x-ray tube capable of handling 200,000 volts and the manufacturers immediately responded with a machine capable of furnishing the current. Since that time both tubes and machines capable of delivering voltages in excess of two million volts have been developed.

Used alone or in combination with radium in selected cases, treatment at higher voltages has done much to reduce the mortality in certain forms of malignant new growths. It has also been a remarkable palliative agent in skeletal metastases. Many conditions, however, do not need these higher voltages. It should be borne in mind always that superficial growths as well as all growths extremely susceptible to radiation should be treated with the lower voltages rather than the higher. The reason for this is the obvious damage done to the normal surrounding tissues. This is best shown by the tremendous increase in pulmonary atrophy or radiation fibrosis of the lungs which developed following the use of higher voltages in the treatment of carcinoma of the breast.

In deepseated abdominal new growths, however, the higher voltages have a very definite advantage. Judiciously used in combination with radium this treatment has resulted in a remarkably higher incidence of cures in carcinoma of the cervix of the uterus. Postoperative radiation in carcinoma of the breast has considerably increased the incidence of five- and ten-year cures when compared with the non-radiated cases.

The reader should bear in mind that the writer has of necessity not been able because of lack of space to give any detailed account of much of the valuable work which has been done by hundreds of capable men during the past twenty-five years. It has only been possible to mention epoch-making discoveries in apparatus and media, in addition to the few outstanding diagnostic procedures which have had the greatest influence in the widespread use of this still comparatively young specialty.

Malaria is not confined to the tropics; in 1937 there were 4,000,000 cases in the United States.

PRIMARY BRONCHIOGENIC CARCINOMA

Report of a Five-Year Surgical Cure

THOS. J. KINSELLA, M.D.

Clinical Assistant, Professor of Surgery, University of Minnesota Medical School
Minneapolis, Minnesota

PRIMARY bronchiogenic carcinoma, in spite of its relative frequency, is probably less well understood than most conditions encountered by the physician in general practice. Much of this occurs because the average physician is quite unfamiliar with the disease as seen clinically, the rest because of the varied picture which the condition itself may present. It is, without doubt, the most notorious masquerader with which we are commonly called upon to contend.

This condition, in the mind of the average physician, is considered a rare one which need not be constantly kept in mind. Such, however, is not the case. It is found in at least 1 per cent of all postmortem examinations, and thus cannot be considered a rare condition. It constitutes from 12 to 15 per cent of all carcinomas encountered at autopsy, and is of the same approximate order of frequency as carcinoma of the uterus and carcinoma of the rectum. The apparent, marked increase in frequency observed clinically can easily be explained by a better appreciation of the clinical picture, while the increase noted in postmortem series may be offset to a considerable degree by a recognition of the fact that numerous cases previously diagnosed as sarcoma of the mediastinum, endothelioma of the pleura, sarcoma of the lung and carcinoma, primary site undetermined, were in reality cases of primary bronchiogenic carcinoma with metastases.

Primary cancer of the lung begins as a malignant pathological process in the wall of one of the bronchi, hence the accepted name primary bronchiogenic carcinoma. Microscopically it may appear as a fairly well differentiated glandular type of structure, adenocarcinoma, as a fairly well differentiated epithelial structure, squamous cell carcinoma, or more commonly as a more rapidly growing undifferentiated mass, now referred to as undifferentiated carcinoma, formerly called an oat-cell tumor or even a sarcoma of the lung. It may begin towards the periphery of the lung but is more commonly recognized in the larger bronchial radicals. The growth may develop relatively slowly or very rapidly, depending upon the

type and degree of differentiation of the tumor itself. This, however, need not be consistent as in some tumors certain areas may be found showing well differentiated adenocarcinoma, others well differentiated squamous cell carcinoma, and still others a wildly growing undifferentiated tumor.

All types of these tumors tend to metastasize, some sooner than others, but all relatively early, and frequently very extensively. Metastases occur frequently along the lymphatics underneath the bronchial mucosa where the tumor may infiltrate to a considerable distance beyond the original site. The regional and mediastinal nodes soon become involved. A few extend peripherally to involve the pleura and chest wall early. The liver is the next most frequent site and is commonly involved, often so extensively that the primary tumor is dwarfed, and an abdominal primary tumor is sought. Widespread metastases throughout the body are frequently seen, with involvement of the brain, the osseous system, the adrenal, kidney, pancreas, thyroid, spleen, cardiac muscle, skin and almost any other structure. Such metastases may so completely overshadow the small primary tumor that it is missed, not only clinically, but even at pathological examination unless a careful search is made.

The frequency of brain metastases in primary bronchiogenic carcinoma is well recognized by the neurological surgeons, who on numerous occasions in the past have explored what were apparently primary cerebral tumors only to find that they were metastatic from a small unrecognized primary in the lung. The metastatic deposits in thyroid, adrenal, kidney and pancreas have at times been mistaken for the primary site of the malignant process and undoubtedly in the past have led to considerable confusion as to the relative frequency of bronchiogenic carcinoma. The pathological course and progress of the condition is so extremely varied that it naturally may be expected to produce a very bizarre clinical picture.

Clinically, as with other carcinoma, this pri-

BRONCHIOGENIC CARCINOMA—KINSELLA

mary tumor of the lung is essentially a disease of the latter half of life, occurring most frequently in the fifth, sixth and seventh decades, although it has been reported in almost every year of life, from a few months of age to the nineties. It must, however, be given most serious consideration in differential diagnosis in patients beyond the age of forty. It occurs four times as commonly in males as in females, a consideration which may be given some weight in making a differential diagnosis in the female patient.

There is, perhaps, no pathological condition which so frequently and efficiently masquerades as some other process. The clinical picture of pneumonia, pulmonary tuberculosis, virus pneumonia, lung abscess, bronchiectasis, empyema and metastatic tumor in the lung may all be simulated by primary carcinoma, or may even be associated with it. An exceedingly careful clinical study may be required to establish the true diagnosis. Probably the most difficult differential diagnosis is that involving a process in the upper portion of the lung with some atelectasis present where tuberculosis and carcinoma must be distinguished, as this is an area where both conditions are frequently encountered. Atelectasis may occur in both, while cough and expectoration, fever, wheezing, blood streaked sputum, tightness in the chest or pleurisy, loss of weight, anemia, and loss of a sense of well-being may occur with either one. The finding of tubercle bacilli in the sputum, of course, would establish the one diagnosis, yet numerous cases of pulmonary tuberculosis with atelectasis do not show a positive sputum at all times because of the bronchial obstruction present.

The occurrence of cavitation within the involved area which ordinarily would suggest tuberculosis may not absolutely indicate it because bronchiectatic cavitations may occur distal to the obstructing mass of a bronchiogenic carcinoma. Bronchoscopic examination, which in other localities of the lung is of extreme value, here may reveal no information whatsoever, as the upper lobe bronchus except for its orifice cannot be visualized through the bronchoscope, and nothing may be available for biopsy examination. Cutaneous tests, cultures, smears, and blocked sputum specimens, iodized oil bronchograms and all other available means may be exhausted and yet no positive proof of the diagnosis established. The case forming the basis for this report is an

excellent example of this problem. In other instances, the finding of a positive sputum does not rule out carcinoma as the two conditions may co-exist, and it is only the alert clinician who will be able to make the complete diagnosis.

The x-ray picture of bronchiogenic carcinoma is frequently considered a pneumonia until the process fails to clear. The same difficulty to a greater degree may be encountered in the so-called virus pneumonia where the picture may simulate a bronchiogenic carcinoma and where delayed resolution is common and will excite less concern than in an ordinary pneumonia. It is well recognized clinically that lung abscess and bronchiectasis may develop distal to any bronchial obstruction, and as bronchiogenic carcinoma so commonly gives partial or complete bronchial obstruction, it is not surprising that an associated lung abscess or bronchiectasis is observed quite frequently, particularly in the slower growing tumors. Add to this the fact that certain malignant bronchial tumors undergo central degeneration with abscess formation and we add another element of confusion. It is common knowledge that 10 per cent of the chronic lung abscesses occur distal to an obstructing bronchial tumor. In older people a lung abscess is quite likely to represent a degenerating carcinoma.

Certain bronchial tumors extend peripherally and involve the pleura, inducing pleurisy or a pleural effusion, either clear, bloody or purulent. The differential diagnosis between carcinoma and tuberculosis with a clear or bloody effusion is not always readily made. In the presence of a purulent effusion the finding of any type of organism in the pus does not rule out carcinoma as secondary inflammatory disease may complicate the picture and lead to an empyema. The recognition of tumor cells in direct or blocked sediments of pleural fluid is not always as simple as it might seem, and unless the pathologist has had considerable experience in such examinations it is likely to lead to errors in both directions.

Metastatic tumors to the lung from other sources may simulate bronchiogenic carcinoma, and conversely bronchiogenic carcinoma may simulate or produce metastatic lesions in the lung fields and elsewhere and lead to error in diagnosis. Some tumors, notably hypernephroma and carcinoma of the colon, have been reported as metastasizing to the bronchial mucosa producing an obstructing lesion which could be visualized

BRONCHIOGENIC CARCINOMA—KINSELLA

through the bronchoscope and at times recognized by biopsy specimens thus obtained. The clinical picture encountered then may be very bizarre, and a great deal of thought and study and numerous examinations required before the true diagnosis is established.

The clinical picture presented by bronchiogenic carcinoma can probably be understood better if consideration is first given to the development and progress of the local lesion. Bronchiogenic carcinoma apparently begins as an isolated neoplastic node in the wall of a bronchus of small, medium, or large calibre. As the mass develops it encroaches upon the lumen of the bronchus, interfering with the passage of air through this area, exciting some secretion and some local irritation, which may produce a slight cough, often times dry, but possibly producing a small amount of clear, mucoid sputum. If ulceration occurs on the surface of the growth, or if coughing is severe, blood streaks or even a small amount of blood may be expectorated. As the growth increases in size filling the bronchial lumen, and it takes only a smaller tumor to do this, even in the larger bronchi, it produces some interference with the passage of air by this point. If this obstruction is partial and permits the entrance of air, but not its exit, there will develop in the lung distal to the tumor an obstructive emphysema which if small will give no clinical findings but which if large may be detected on physical examination as an area of normal to hyperresonant percussion note, with distant breath sounds and probably no rales, and on x-ray as a local area of increased translucency of the lung.

If the obstruction becomes more complete and air can neither enter nor leave the involved area of the lung, the air trapped distal to the mass absorbs rather rapidly producing an atelectasis of this portion of the lung which again if small cannot be found clinically but which if larger may be recognized by an area of altered percussion note, from impairment to dullness, with distant to absent breath sounds early, later replaced by the increased transmission of solidified lung. There are usually no rales present, though if the obstruction is slightly intermittent or is altered by deep breathing or cough, a wheeze or squeak may at times be heard. Clinically there is a sensation of tightness in the chest in the involved area, at times interpreted as slight pleural pain. Roentgenograms show an area of increased

density in the lung field usually of homogeneous consistency with displacement of the heart, mediastinum or diaphragm to the involved side, if the area involved is large.

The patient by this time may have noticed a slight wheeze or clicking sensation in the involved area, particularly after cough, on exertion, or upon taking a deep breath, and may have experienced a gradual loss of strength, a sense of fatigue, or may have become somewhat anemic depending upon the amount of cachexia associated with the local growth. As the tumor continues to grow there is frequently increasing cough with expectoration of nonpurulent sputum, at times blood streaked, occasionally true pleural pain, a slight sense of breathlessness even without exertion, or even an inability to take a deep breath. If secondary infection now enters into the picture in that portion of the lung distal to the obstruction there may be a change in the character of the sputum which may take on the character of that of a bronchitis or bronchiectasis, or even become foul if abscess develops. Fever in varying degree may appear. Ulceration of the local growth may produce frequent bleeding, usually not large in amount, though rarely it may be so. If pleural involvement occurs a pleural effusion may develop following an acute attack of pleurisy and increasing dyspnea result from the accumulation of fluid in the pleural cavity.

The progress from the original state to this stage may be a matter of days, weeks or even months depending upon the rapidity of growth of the tumor and the amount of obstruction produced. By this time usually the patient has sought medical advice and may have received considerable treatment under a variety of diagnoses. Primary bronchiogenic carcinoma may be considered, though it frequently has not been given any consideration up to this time. As the disease progresses all symptoms may become more marked. The patient may now begin to complain of symptoms resulting from secondary involvement of other structures, such as pain from involvement of the pleura, chest wall or ribs, or difficulty in breathing from the involvement of the bronchial nodes; difficulty in swallowing from encroachment of such nodes upon the esophagus, or breathlessness from interruption of the phrenic nerve by tumor tissue in the mediastinum or by increasing pleural effusion; pain in the shoulder girdle or tro-

phy of the muscles about the shoulder girdle from direct involvement of the upper ribs, vertebral bodies or brachial plexus as occurs at times in apical carcinoma; eye symptoms from interruption of the sympathetic trunk; headaches, nausea and vomiting and all of the findings of a primary brain tumor from cerebral metastases; backache and abdominal pain from involvement of the retroperitoneal nodes and the liver, or local symptoms referable to almost any site invaded by the tumor.

Secondary infection in the lung about the tumor may change the whole picture to one characteristic only of lung abscess or bronchiectasis, or if in the pleural cavity to that of an ordinary empyema. From a diagnostic standpoint these latter considerations are of interest and must be taken into account, but from a therapeutic standpoint they all develop because of the spread of the disease from the original local site and are indications of disease which has progressed beyond the stage where clinical cure can be obtained by any means. Our clinical goal must be the diagnosis of the disease before it has reached this stage if we hope to offer more than palliative treatment to the patient.

Diagnosis

Probably one of the most important factors in establishing a diagnosis of primary bronchiogenic carcinoma lies in keeping the condition always in mind and looking for it under any and all circumstances. It is most frequently overlooked because it is not considered in the differential diagnosis. In general, any patient over forty, particularly a male, who develops unexplained, persistent cough, expectoration, blood spitting, wheezing, breathlessness, tightness in the chest, pleurisy or pleurisy with effusion, asthma, "chronic bronchitis," should be suspected of possible bronchial involvement. Added to this group should be all patients presenting unresolved or slowly resolving pneumonias, atelectasis, localized emphysema, and all other peculiar or unusual shadows on x-ray, particularly in the older group, but including some in all age groups. The findings of a local emphysema or atelectasis, or a localized persistent wheeze on physical examination should arouse suspicion of a bronchial obstruction, possibly from tumor.

Sputum studies to relatively rule out tuberculosis should always be made, following which sputum, particularly particles which might re-

semble tissue, should be embedded, and sectioned for microscopic examination for tumor cells. Similar studies should be carried out on pleural fluid. Roentgenograms of the chest, and good iodized oil bronchograms should then be made. No examination is complete without a thorough bronchoscopic examination with biopsy of suspicious areas. In upper lobe lesions with atelectasis where nothing can be seen on bronchoscopic examination, it may be wise to establish an artificial pneumothorax on the affected side with the idea of pushing the upper lobe down and changing the angle of the upper lobe bronchus so that it may more readily be visualized. In certain instances, following the establishment of pneumothorax, pleuroscopy may be indicated if pleural metastases are suspected. This procedure may at times save the individual an unnecessary exploratory thoracotomy.

When all other methods of conclusively establishing the diagnosis have failed and there is still a strong probability of bronchiogenic carcinoma or one cannot be certain whether the lesion is operable or not, even when clinically proven, exploratory thoracotomy is indicated. At times this will reveal ample evidence of the presence of a bronchiogenic carcinoma which can then be adequately treated surgically at the time. It was by finally resorting to this method that the present five-year cure was accomplished.

Once the diagnosis has been established and surgery is being considered, thorough studies must be made to rule out metastases in all possible locations. The establishment of a pneumoperitoneum, followed by roentgenograms of the liver region for irregularities may at times reveal liver metastases. Peritoneoscopy with direct visualization of the surface of the liver may demonstrate liver metastases which, of course, would indicate a hopeless, inoperable condition.

Treatment

The fundamental considerations in the treatment of primary bronchiogenic carcinoma are the same as those of carcinoma elsewhere in the body, namely, early diagnosis and the complete eradication of the tumor-bearing organ and its regional lymphatics before the disease has spread from its local site of origin. This, in primary bronchiogenic carcinoma, means a total pneumonectomy by primary dissection within the mediastinum, with removal of the regional lymph nodes which drain the affected lung. Lobectomy

or pneumonectomy by tourniquet method should be regarded as incomplete operations and considered as analogous to simple amputation of the breast for carcinoma. If the condition is inoperable as proven by preliminary studies or at exploratory thoracotomy, which must be resorted to quite frequently, then palliative treatment by radiation therapy may be indicated and may at times afford considerable relief. It is not, however, to be considered as curative as no convincing cured cases have been reported by this method. For the relief of dyspnea, cough, wheezing, chest pain or certain obstructive symptoms considerable may at times be accomplished by it.

Criteria of Operability

Once the diagnosis of primary bronchiogenic carcinoma has been established the whole situation should be reviewed as to the possibilities of surgical intervention. The following may be presented as criteria of possible operability.

1. Absence of metastases both local and distant, especially in the lung, pleura, mediastinum, liver and brain.
2. The absence of nerve or bone involvement, particularly of the phrenic, recurrent laryngeal or sympathetic trunks, and the ribs adjacent to the tumor.
3. The absence of pleural fluid, even if carcinoma cells cannot be demonstrated in it.
4. The absence of involvement in the trachea and proximal centimeter of the main bronchus on the affected side.
5. The absence of rigidity of the trachea or bronchi on the affected side, suggestive of peribronchial infiltration or nodal involvement.
6. The absence of cardiac, renal or other serious constitutional disease.
7. The general physique must be sufficiently robust to offer a legitimate chance of withstanding the radical operation necessary.
8. The age group and expectancy must be such as to justify the radical surgery.

Contrariwise, the following may be considered as absolute criteria of inoperability:

1. Distant metastases of any type.
2. Large mediastinal mass.
3. Evidence of interruption of the phrenic, sympathetic or recurrent laryngeal nerve from direct infiltration by advancing tumor.
4. Cervical or axillary nodes positive to biopsy.
5. Involvement of the trachea or primary

bronchus immediately adjacent to it by tumor tissue.

6. Evidence of pleural involvement with demonstrable masses, the finding of malignant cells in pleural fluid, and possibly even the presence of pleural fluid alone.

7. Age, marked debility, coronary heart disease, or other serious lesion indicating a limited expectancy.

If the conditions first outlined can be met, or at least tentatively met, we then feel justified in recommending an exploratory thoracotomy, planning upon radical surgery if local conditions prove favorable. At operation, local conditions may be found which render the condition inoperable, such as lymph node involvement beyond the primary nodes, direct infiltration of the chest wall, invasion or fixation of tissues within the mediastinum. The finding of isolated lymph nodes in the mediastinum *per se* may not indicate that the condition itself is inoperable, because associated secondary infection in the lung may give rise to a nonmalignant lymphadenitis.

From the surgical standpoint primary bronchiogenic carcinoma presents some of the same surgical possibilities for cure as does carcinoma of certain other accessible localities, such as the breast, stomach and colon, where there is a blood supply which can be controlled and a primary lymphatic drainage system which can be excised with the tumor and surrounding tissues. The surgical possibilities of such a condition have been recognized for a considerable period of time, but it is only within the last ten years, with the modern developments in thoracic surgery and anesthesia that the condition has been successfully treated surgically.

Resection of the lung may be carried out either through an anterior or a posterior thoracic incision depending upon the surgeon's preference. Both afford adequate exposure and access to the hilum of the lung for primary ligation of the vessels, primary section and suture of the bronchus and a primary excision of the regional lymphatic nodes. If conditions warrant, the procedure may be carried out in two stages, the first including a dissection of the hilar structures up to and including ligation of the pulmonary artery, for the lung will survive following its ligation if there is no interference with the venous return. The second stage of the extirpation may be carried out at a subsequent date. Pneumo-

BRONCHIOGENIC CARCINOMA—KINSELLA

nectomy by mass ligation, lobectomy by either mass ligation or primary dissection must be considered as inadequate operations for they do not fulfill the primary principles recognized as adequate for the successful treatment of malignant disease.

Case Report

Mr. A.I.B., sixty-two years of age, a hotel keeper and former railroad conductor, was admitted to the Northwestern Hospital on July 7, 1937. He first consulted me on June 21, 1937, on the advice of Dr. E. E. Carpenter of Superior, Wisconsin, because of cough, fever and loss of weight. He had apparently been perfectly well until the middle of December, 1936, when he developed an acute tonsillitis followed by a severe arthritis of his right great toe which persisted for two weeks. With the tonsillitis he developed a fever of 101 degrees Fahrenheit with cough and expectoration of a clear mucoid material, 15 cubic centimeters in amount in twenty-four hours. After the acute process had subsided, however, cough and expectoration of clear mucus with some dyspnea without wheezing persisted. Physical examination and fluoroscopic examination on January 20, 1937, were reported as negative. He gradually lost in weight and strength. An x-ray picture of his chest in April was interpreted as showing an unresolved pneumonia.

He remained in a rest home for a few weeks until his admission to the Middle River Sanatorium on May 26, with a tentative diagnosis of pulmonary tuberculosis. All studies in the sanatorium, including many examinations of sputum and guinea pig inoculations, were negative for tuberculosis. The possibility of bronchiogenic carcinoma was considered and he was referred to Minneapolis for further studies. During this period of time he had lost weight from 217 to 178 pounds, but had regained 7 pounds during his residence in the sanatorium. His cough and expectoration had continued but the dyspnea had disappeared with bed rest. There had been no wheezing at any time. For a period of about ten days there had been slight discomfort in the left anterior chest which disappeared under symptomatic treatment. Aside from a persistent fever of 99 to 100 he had no symptoms of note.

Physical examination revealed a large, well-developed, well-nourished, adult male, 5 feet 9 1/4 inches tall, weighing 185 pounds, with evidence of recent weight loss. His blood pressure was 120/70, pulse 82, temperature 98.4, respiration 18. The head, eyes, ears, nose and throat were normal. There were no enlarged lymph nodes. The thyroid gland was normal. The heart was normal. The blood vessels were soft. The right side of the chest was negative to physical examination except for an occasional sibilant rhoncus on deep inspiration in the inner second interspace, probably transmitted. The left side of the chest showed a normal percussion note with breath sounds very distant over the upper lobe. Whispered voice, spoken voice and tactile fremitus were diminished over the upper lobe, with a sibilant rhoncus on deep inspiration in the upper half of the chest.

There were no rales to be heard after cough. The left diaphragm was slightly elevated but not paralyzed. The abdomen was normal, the liver not palpable, and no masses present. The genitals were normal. Rectal examination was negative. The reflexes were normal.

Laboratory Findings: Hemoglobin, 11.2 grams; erythrocytes, 3,911,000; leukocytes, 11,300; polymorphonuclears, 74.5 per cent; lymphocytes, 16 per cent; large mononuclears, 3.5 per cent; eosinophiles, 5 per cent.

The blood Wassermann was negative. The urine was normal. The electrocardiogram was normal. The sputum was negative for tubercle bacilli, and no tumor cells could be found.

Radiograph of the chest showed the heart and aorta shadows normal in size, shape and position. The right lung was normal, right diaphragm free. The left side of the chest showed a homogeneous density extending out from the hilar region in the upper portion of the chest which had increased considerably since the previous examination in May of 1937. This represented a localized atelectasis with some secondary emphysema in the upper lobe. The left diaphragm was slightly elevated.

A radiograph of the chest made after the establishment of a diagnostic left pneumothorax showed the right lung to be clear with a density extending out from the left hilum which was definitely in the left upper lobe. Conclusion: Bronchiogenic carcinoma with atelectasis and emphysema of the left upper lobe; normal right lung.

X-ray examination after the ingestion of barium revealed a normal stomach and cap, a normal distribution of the meal at the end of six hours, and a normal colon. There was an extensive hypertrophic arthritis of the lumbar spine.

Bronchoscopic examination performed by Dr. L. R. Boies on July 8, 1937, was reported as follows: The tracheal mucosa appeared to be normal. The carina was not thickened or injected. The openings of the right lower, middle and upper lobe bronchi were normal. In the left main bronchus there was an excessive amount of secretion. The mucosa of the left main bronchus was definitely injected and thickened, but there was no granulation nor points that bled easily. The lumen of the secondary trunks contained purulent secretion which was aspirated. There seemed to be some edema about the orifices of these secondary bronchi, with no evidence of any tissue suggesting malignant disease.

After the establishment of a left artificial pneumothorax another bronchoscopy was performed by Dr. Boies who reported as follows: The right side was negative. The left main bronchus contained a moderate amount of mucopurulent secretion. The bronchus to the left upper lobe appeared to have sagged down moderately as if it were compressed. No tumor or granuloma could be seen. The bronchus to the upper lobe could not be explored.

Although after extensive study we could not visualize a bronchiogenic carcinoma we were convinced clinically and by the x-ray picture that this condition did exist.

BRONCHIOGENIC CARCINOMA—KINSELLA

After discussing the whole picture with the patient and the family an exploratory thoracotomy was recommended.

Operation: Left total pneumonectomy (Reinhof technique). On July 20, 1937, under intratracheal cyclopropane anesthesia administered by Dr. Ralph T. Knight the left side of the thorax was opened through a curved anterior incision over the third interspace, with section of the cartilage above and below. There was an extensive pneumothorax present. The mediastinum was quite stable. There were extensive adhesions along a linear line at the level of the third rib anteriorly for a distance of about 12 centimeters. The upper lobe was adherent to the mediastinum above the hilum and to the lower lobe along the interlobar fissure. The upper lobe showed an obstructive emphysema, the lobe collapsing very little even under pressure, interfering considerably with our exposure. The lower portion of the upper lobe showed a hard nodule in the periphery with considerable induration throughout the lower half. The lobe, however, was mildly crepitant throughout, with a marked anthracosis present. The lower lobe was apparently normal. The hilar structures were not indurated; there were no large nodes present. There was no free fluid or tumor mass in the pleural cavity.

After the mediastinal pleura was opened, three enlarged lymph nodes were encountered, two above the pulmonary artery and one below the inferior pulmonary vein. These were dark and soft and were excised and sent to the laboratory for examination and reported as negative for tumor.

The pulmonary artery was freed by blunt dissection, doubly ligated with No. 2 chromic catgut, transfixed and again doubly ligated with braided silk and then sectioned. The superior and inferior pulmonary veins were treated in like manner. The main bronchus was then dissected free, cut across about a centimeter from the carina, slit for a short distance transversely to weaken the cartilages and then closed with two layers of interrupted silk sutures. All lymph nodes encountered locally were excised. The posterior flap of mediastinal pleura was then tacked over the bronchial stump and the rest of the mediastinal defect closed with continuous silk suture. The chest wall was then closed without drainage, resuturing the divided cartilages and approximating the ribs by pericostal sutures, closing the intercostal muscles with continuous catgut and tacking the pectoralis muscle down over the incision to give an air-tight closure. The skin was closed by a lock stitch of dermal suture and then sealed with mastisol.

The patient tolerated the operative procedure very well, and while on the table was given 1000 c.c. of citrated blood, 2500 c.c. of normal saline and 500 c.c. of 5 per cent dextrose. The highest blood pressure recorded was 160/84, the lowest 96/64. The highest pulse rate was 96, the lowest 72. The highest respiratory rate 24, low-

est 16. At the close of the operation his blood pressure was 124/80, pulse 84, respiration 20. He returned to his bed in good condition and was immediately placed in an oxygen tent where he remained for thirty-six hours when he decided he wished it discontinued. His condition remained satisfactory. He had considerable thick mucus in his throat which gave him a moderate amount of cough from which he developed considerable subcutaneous emphysema over the left side of his chest. Blood pressure, pulse and temperature were good, and the respiration slow except when disturbed by cough. There was no cyanosis present. The right lung remained normal except for a few coarse rhonchi at the base, a rather inconstant finding.

The wound healed by primary intention and remained clean. The left pleural cavity rapidly filled with fluid, a small amount of which was aspirated for study on the eleventh postoperative day. It was a clear amber fluid which was sterile on culture. His condition continued to be satisfactory with gradual disappearance of his cough and expectoration. He was discharged from the hospital on August 25, 1937, on the thirty-sixth postoperative day, weighing 161 pounds, after walking freely about the hospital for several days.

The excised lung showed a tumor not over 1.5 cm. in diameter obstructing the left upper lobe bronchus. It was somewhat irregular in shape, lying wholly within the lumen of the upper lobe bronchus, approximately 1 cm. up from its opening. There were two indurated areas in the parenchyma of the upper lobe which on section showed a marked bronchiectasis with considerable secretion present. There was an obstructive emphysema of the whole upper lobe. Microscopic examination of the tumor itself showed a well differentiated squamous cell carcinoma. The indurated areas of the lung showed only an organizing pneumonia with no malignant tissue present. The excised lymph nodes showed no evidence of tumor.

The patient's subsequent course has been entirely satisfactory. The left pleural cavity apparently filled with fluid which later coagulated, giving a diffuse opaque shadow over this side. There has been a gradual shift of the heart and mediastinum to the left without excessive displacement or embarrassment. The patient has remained in good health and has had no serious illness since that time. He has only very slight dyspnea which apparently does not handicap him as he has been able to continue his work as manager of a small hotel. It has been unnecessary to even consider collapsing his left chest wall by thoracoplasty as is sometimes necessary if mediastinal displacement causes trouble. He remains in good condition at the present time, five years and three months after the total removal of his left lung for carcinoma. Incidentally, this case is of interest historically as it is the first successful total pneumonectomy for carcinoma in Minnesota or adjacent territory.

For the first time since 1935 and the second time in history, the Hawaiian Board of Health recorded no deaths from diphtheria last year, in spite of the war.

MEDICINE IN MINNESOTA SIXTY YEARS AGO

WILLIAM DAVIS, M.D.

Saint Paul, Minnesota

ACCORDING to the United States census of 1880 the population of Minnesota in that year was 780,000, just two million less than in the last census. Minneapolis, the largest city, had 46,000 and Saint Paul 41,000. Duluth, now the third city in the state, was then a village of 3,500. While physically it was the beautiful state of today, perhaps even more beautiful, because its woods and waters were less disturbed by man, it was a far less comfortable place in which to practice medicine, its country roads for the most part merely beaten tracks across the prairie, with little attention paid to grading, surfacing, and drainage.

Even in the cities there was no block paving and little macadam in the streets, with sidewalks, if built at all, made only of wood. The result was deep dust in summer, mud in spring and fall. Only in winter was the going really good when the streets, little vexed by car tracks, had a uniform coating of ice and packed snow that made wonderful sleighing, so lasting and reliable that the fire apparatus abandoned wheels and went on runners for weeks and sometimes for months.

Railroads were few and accommodations simple. Two lines brought the passengers from Chicago and the trains took fourteen hours for the trip, stopping at eating houses for meals. The Northern Pacific was nearly through to the Pacific coast, the Great Northern, then the Manitoba Road, following soon. There were two roads north to Lake Superior. Trains had just emerged from the old jerky link and pin to the solid coupling. In the cities there were a few street car lines, the cars drawn by one or two horses or mules, the car seats running lengthwise, and in cold weather a few inches of straw on the floor. The driver on an open platform not infrequently got his nose frozen and shivered in a buffalo coat.

Such were the external conditions under which medicine was practiced. The doctor came from a college with at most a three-year course, or he bought his authority to practice from a diploma mill. But the Medical Practice Act was on its

way and irregulars were about to be curbed. Even as it was then, it is surprising how little in evidence were the incompetents. The man with three years in a medical school and a year in a hospital represented the best equipment for medical practice.

Few of the counties in the state had their own medical society or one within reach in a neighboring county. The meeting of the State Society gave to many doctors their only opportunity of getting into contact with their fellow practitioners and exchanging professional information and experiences. It was discouraging work to try to keep a county society going, where the members were few in number and widely scattered. Sometimes not even a quorum of one could be raised for a stated meeting. Even in the cities things were not any too good. At least in Ramsey County the meetings were held in some doctor's office, with scanty attendance and little enthusiasm. The office was in a downtown building, heated by a stove and lighted by kerosene lamps or flaring gas jets. Few buildings had radiators and only a few of the most opulent specialists could afford an office with steam heat. Not always could even a single medical paper be furnished. No wonder attendance languished at times, and that at one meeting of the Ramsey County Society the secretary records the presence of three doctors and his, the secretary's dog. In the country, of course, it was impossible to make professional calls without some kind of a team. As the roads were broken out chiefly by farm wagons it was awkward for one horse to travel, particularly in winter, where a single horse could get along only if the shafts were attached to the side of the cutter so that the horse would track with one of a team. In the city most of the doctors' buggies and cutters were drawn by one horse, only a few men being able to drive a pair. In the early years of his practice the city doctor sometimes managed to get about on foot, using the street cars as far as he could; indeed, even so prominent a surgeon as Fenger, of Chicago, through his whole career had no horse. But few doctors failed to set up a rig as soon as they could afford one. While

making a visit the horse would be anchored by a weight, and in cold weather had to be blaneted, a process that must have been attended with some risk of carrying tetanus germs to the patient.

Telephones were not in general use, and although practically every doctor had a telephone in his house, many offices were not so provided. It was largely the custom then for the druggist to own office rooms over his store and to lease them cheaply, sometimes to give them rent free to doctors, the druggist expecting the doctor overhead to steer the prescriptions he wrote to the store below. That this led to abuses at the expense of the patient is easily seen. As a part of this alliance the doctor had his office calls come to the drug store, thus saving the expense of an office telephone. A stranger asking at the drug store to be directed to a good doctor would be very sure to be sent to one who fed his prescriptions to that store. To call a doctor, the druggist's telephone frequently was used by people living in the neighborhood, and the fire department, while not permitting the general use of the telephones in the stations, made an exception in the case of a call for a doctor. A large share of the doctor's calls came directly to the house, where a speaking tube led from the porch to the doctor's bedroom in which there was also an extension from the door bell. Once in the early hours of a still summer morning I was awakened by the sound of a gunshot. I listened for a few moments but heard nothing more and was dropping off to sleep again when my door bell rang and through the speaking tube I was asked to go to the house of a patient a few blocks away. Standing on the sidewalk I found a young policeman who said he had brought the call. On reaching the patient I found he had been seized with a pain so unbearable that he felt he must get relief at once. Alone in the house, with no telephone, necessity drove him to fire a shot from his pistol out of the window to attract attention. This brought the policeman of the beat on the run, and when hailed he consented readily to go and call the doctor. Indeed my patient said that the officer's relief was apparent when he found that the shot was an innocent one. Note that this was described as a *young* policeman. Had it been an older and more sophisticated man he might well have moved away from the sound of the shot instead of toward it, particularly as only a few

years before a policeman had been shot and killed when on this beat at night.

The only regular medical journal in the state was the *Northwestern Lancet*, which appeared first in 1881 with only a few small pages of reading matter and advertisements, and no cover. Ten years before there had been a *Northwestern Medical and Surgical Journal* which after a fitful and varied existence gave up the ghost. The *Lancet* lives still in the form of the *Journal-Lancet* which is its direct descendant. For some years after the *Lancet* was started the only other medical publication was the bound volume of transactions of the State Medical Society, and that volume was given up when the *Northwestern Lancet* became big enough to publish the transactions and save the Society the expense of the separate volume.

Sixty years ago the prevalent diseases were quite different from those of today. The mortality reports tell us that the disease causing the largest number of deaths was called cholera infantum, a name that no longer appears in the International List of Causes of Death. Diarrhea and enteritis, grouped together today, now cover the class of cases then listed as cholera infantum, which with its congeners enteritis, gastro-duodenitis, entero-colitis, colitis, and infantile convulsions accounted for twice as many deaths as pneumonia, the next in the list; then came typhoid fever, followed by pulmonary tuberculosis, then called phthisis. Diphtheria, with its related membranous croup, so-called, took a heavy toll. On the other hand heart disease and cancer, now the leaders, then were low in the list. The prevalence of typhoid is accounted for by the fact that much of the drinking water came from surface wells. Minneapolis took its public water supply from the river; Saint Paul's city water came from a lake by gravity only, so that only the lower levels of the city could be reached. Pasteurization of milk was yet to come. Tuberculosis was not recognized as directly communicable. Except for smallpox there was no vaccine, and serums for prevention and cure came much later. For the tuberculous, rest came only when forced by increasing weakness; instead of seeking outdoor life the poor consumptive was likely to be shut up in a closed room under heaped up blankets and comforters lest a draft might aggravate his "cold." Influenza appeared as an epidemic first in 1889, although before that

REMINISCENCES—BOLEYN

severe colds were sometimes spoken of as influenza. Infantile paralysis was known as a sporadic disease, but it was nearly 1900 before acute poliomyelitis anterior was recognized as an epidemic. Fitz unmasked the appendix in 1886. For the cases that appeared before that time the favorite name was "inflammation of the bowels," the more scientific names, typhlitis, and perityphlitis not being by any means universally used even by doctors. Operation was done only when a manifest abscess called for incision.

The search for the causes of disease was like groping in the dark and the conclusions arrived at seem fantastic today. A case of typhoid threw suspicion upon a neighboring dungheap. Scarlet fever or diphtheria caused a sniffing for sewer gas. Malaria was attributed to the "miasm" arising from low lands. Colds were caught from drafts, not from a sneezing or coughing neighbor. Although Holmes, and later Semmelweiss, had insisted on the contagiousness of puerperal fever, their teachings were not generally acted upon and little attention was paid to keeping clean the hands of doctor and nurse. Fortunately most confinements were in the home, for the mortality in lying-in wards and hospitals was frightful, even as high as 10 per cent, doctors, nurses and contaminated dressings spreading the infection from case to case. Why, the doctor sixty years ago knew almost nothing about the blood except that there were red cells and white cells that could be counted by the hemometer, which, with the microscope, the stethoscope, and the clinical thermometer were the chief tools in general use. The higher powers of the microscope had been but lately developed and, with increasing skill in the

staining of specimens, making visible the minute and transparent bodies called microbes, were revolutionizing the old ideas of pathology, putting an end to the long war between the supporters of the humoral and the cellular theories, and causing both factions to unite against the new science of bacteriology. When it came to treatment, the doctor depended chiefly upon long known drugs, with little reliance upon diet and hygiene. He got little help from the few and ill-equipped hospitals, to which the trained nurse was yet to come.

Only a few bold spirits were opening the abdomen. The skull was operated upon only for depressed fracture, and the joints were left severely alone, for the era of antiseptic and later aseptic surgery was only beginning. Abdominal operations were for the most part ovariotomies, huge tumors that had been repeatedly tapped and whose contents nearly filled the wash tub placed under the table. Hernias got trusses. Pelvic surgery was undeveloped and there was little encouragement for cesarean section, which was not successfully performed, in Saint Paul at least, until 1889. Surgery was limited chiefly to amputations, resections, the removal of growths on the surface, and the handling of fractures and dislocations.

There is a temptation to say something about the many fine men who practiced medicine and surgery in Minnesota in those days. To tell about them all would carry this paper beyond its proper limits and to select a few only would be an invidious distinction. Their memory is enshrined in the homes to which they brought help and comfort, and it could have no fitter memorial.

REMINISCENCES

E. SYDNEY BOLEYN, M.D.
Stillwater, Minnesota

MY FIRST patient was a primitive native American, and it happened in this way. Four of us were, by permission, camping on an Indian Reservation, quite a distance from the agency, which was the nearest place where we could obtain needed provisions for ourselves, two ponies, and one dog. This was in the month of June, 1885, and, as our plans were to stay for a year, we had to make several trips to the agency

to bring enough supplies to last us for such a period and do it before winter. As it took three days out, one of rest, and three back, the summer was about gone when we felt our rations were ample. When on one of these trips I called on the Agency Doctor for some remedies and when he found out I was medicine-minded he then asked me to stay in his office while he made a call some distance away. I told him I wouldn't know

what to do in case any sick ones called. He said, "Oh, just look around for something—anything you find that won't do them any harm—give it, and with a lot of instructions, for if it does not work you can always blame it on their own carelessness." So I became the Agency Doctor, *pro tem*. An invitation to supper at the doctor's house was looked forward to, as the doctor's wife (bless her) was not only a very charming woman, but also a most excellent cook, and I was comfortably ensconced in the doctor's swivel chair, feet on the desk, and my thoughts pleasant in anticipation of that supper, when a whoop rudely disturbed my dreams. I looked around and saw a squaw who, while not remarkable in height, was certainly very extraordinary in circumference. I looked at the door, then at her, and wondered how she got in—but there she was. She whooped again, pointed to her stomach, then to her mouth, by which gestures I supposed she wanted medical attention.

Following the doctor's instructions, I took stock of the pills and potions in his surgery and decided on some powders in a tin box, one kind in a blue paper, the other in white. Among the few office fixtures was a wooden bucket, half filled with water, on which sailed a rudderless tin cup; this helped me to solve the problem of medication. I gave her the powder in the blue paper with some water to wash it down; I then put the white powder in the cup, added some water, stirred up the mixture and by motions indicated she should swallow this without delay—which she did. She had hardly downed this when she commenced to roll her eyes and whoop to beat the band. I had to turn about to hide my desire to laugh—she looked so funny. When I looked around she was gone. Then my conscience—it is very inconvenient to have one—commenced to work and smote me viciously, and I knew remorse, until another whoop demanded my attention. There was the same squaw with five more, all pointing toward their tummies and open mouths. I accommodated them as long as the powders lasted; "a good time was had by all." I wondered how they would feel the next day or that night, and also if I had not started something for the doctor. When they were gone I locked up the office—I thought this best—and silently stole away to the doctor's house and told his wife what I had done. It is fortunate that it is next to impossible to perish from laugh-

ter, but I think the doctor's good wife then came very near it; not so the doctor, who, when told, said: "Hell, those Seidlitz powders were for the white folks around here and not for the Indians."

My next adventure connected—if remotely—with medicine happened while I was House Physician at St. Barnabas Hospital and a student at the Medical Department of the University of Minnesota in the year 1890. At that time many interns, or house physicians or surgeons, as they were then called, were undergraduates and called doctors, as were medical students just as soon as they entered a medical school, for no good reason that I know of. Dr. Perry H. Millard had now succeeded in establishing a real medical school, up to the standards of the best ones in the states, and, when this became known, the number of students increased so rapidly that a shortage in necessary materials for teaching, especially in anatomy, became acute. I heard Dr. Hendriks complain about the shortage of dissecting material, so, when on one Saturday at a football game I mentioned this to Harry Lee d'Arms of Stillwater, an Ann Arbor student intern at the Minneapolis City Hospital, he told me that a man, a county charge, had died at the Stillwater City Hospital and had not been claimed by any of his relations. Although this man had some money he was, by the influence of a relative in the "Marble Business," put on the county. This relation—so the story ran—would then get his money for putting up a stone, or marker, at his grave. Harry and I decided to act at once but since it was on a Saturday when Dr. Hendriks could not be reached for a requisition (he was the only one in the state then who could issue one), we decided to take a chance without it. We went to Stillwater, claimed the body, and early Monday morning I, with the body, left by train for Minneapolis. Arriving at White Bear I got a telegram ordering me to "bring P. back." I got P. transferred to the Minneapolis branch. At the Minneapolis Union Depot another "bring P. back" awaited me. I hurried out and got a dray man, had him drive as fast as he could to the University Medical School. There the dray man gave the box a pull so that it barely balanced on the rear end of the wagon when he suddenly stopped and excitedly asked, "Is that a stiff?" to which I answered, "Yes." At that he jumped up on his dray, grabbed the lines and cut the horse a smart clip with his whip. The horse jumped,

REMINISCENCES—BOLEYN

the box slid off and landed on the sidewalk, and the man went his way without his pay. I got the janitor, Mr. Rose, had him take care of the box and what was in it, and went for Dr. Hendriks for the now badly needed requisition. Dr. Hendriks was lecturing when I rapped on the door, which he opened, and when he saw me he said—without giving me a chance to explain or give a reason for my temerity—"any man old enough to have hair on his face ought to know better than to disturb me while lecturing," slammed the door shut in my face, and that was that. I hurried up to see Dr. P. H. Millard, the Dean, and was lucky in meeting him as he was leaving his office for Saint Paul. Just then another "bring P. back" message was handed me by Rose. With that, my explanation and Rose certifying to the stiff, Dr. Millard (he had lots of hair on his face, too) disturbed Dr. Hendriks, got the requisition and also a handsome apology. Armed with the requisition I went to the depot, met the undertaker and a detective, who pompously put his hand on my shoulder and said, "I arrest you in the name of the law of the Commonwealth of Minnesota." When I asked the reason, he said, "for taking a stiff without a requisition." Then came my hour of triumph when I pulled out the precious document and explained that in the hurry out of Stillwater I forgot to hand it to Mr. C., the undertaker, and this was the last of it as far as I was concerned. However, the next morning the *Minneapolis Journal* had a large picture of Dr. Hendriks right in the center of the front page and in large letters the label, "Body Snatcher." Mr. P., having died from typhoid, then a very fashionable disease, was very lean and made fine dissecting material, and Dr. Hendriks had many demonstrations out of him.

This was the year 1890, also the year when Dr. Koch announced his discovery of tuberculin, which, with its promises, electrified the world. The Medical School and Dispensary was then located across the street from St. Barnabas Hospital. A year later, from near and far, came those afflicted with tuberculosis to get the promised cure by this new treatment, but the University was not prepared to give it. On the spur of the moment I wrote to Dr. Koch, asking for tuberculin, stating I knew the technique, and signed this as House Physician, St. Barnabas Hospital, which in Europe meant a lot but here nothing at all. I posted this letter and promptly forgot all

about it until, one day, I received a notice from the Custom House to come and get a package and to pay charges on same.

It proved to be a supply of tuberculin direct from Berlin. Now that I had it, I did not know what to do with it. Among the doctors who had patients at St. Barnabas was Dr. J. Clark Stuart, Professor of Pathology at the University, who, I noticed in going the rounds with him, took a very keen interest in his patients. I went to him and he said, "This is a package from Heaven. We will see Dr. Nothnagle." The latter was an enthusiastic and thorough worker in general medicine at the dispensary. He rounded up quite a number of cases of pulmonary tuberculosis, selected those he thought resistant to other forms of treatment, graded them so that of two of each kind one would receive tuberculin and the other just scientific neglect and serve as a control. Some were hospitalized, but most of them, not very far advanced, stayed at private homes or boarding houses. All of them received special instructions as to rest, exercise, diet and personal hygiene. In six months none of those receiving tuberculin was alive. At first they gained in weight but soon became increasingly anemic and flitted to happier hunting grounds. All of the controls were alive after six months. Most of them improved in health and some were apparently cured or the disease arrested. This was undoubtedly due to a more understanding, sympathetic, personal attention, and to rest and diet.

I think our experience with tuberculin was quite general and fulfillment of the high hopes of cure or prevention of this dreadful disease vanished after many disappointing trials. Since then its real value as a diagnostic agent has been demonstrated and it has proven a boon and an invaluable gift to humanity.

In 1894, the medical care of the inmates of the State Prison at Stillwater was administered by a visiting local doctor who came once daily. A guard, who had been a hospital steward during the Civil War, looked after them in the meantime and also did the nursing, if any.

The twine and shoe factory machinery, worked by the prisoners, caused some accidents and, as the visiting doctor was not always available for such emergencies, the prison management decided to employ a full-time graduate as intern and to bring the so-called hospital up to more modern standards. Dr. Perry H. Millard recommended

me for this position because of my hospital experience and so, after graduating in June of that year, I became the first full-time medical man at this institution. I had to examine all the prisoners there, those who came and those who left. A small laboratory was added to the hospital and surgical instruments were purchased.

At that time the inmates numbered between 550 and 700. Twice a day the Deputy Warden made the rounds and picked up those who wanted to see the doctor, and usually from seventy-five to 100 or more felt this need. That was too many for proper attention and the problem was how to eliminate the "non-sick" or loafers. Cole Younger, who was my runner, made a suggestion that worked; he said that there were a couple of barrels of cod liver oil in the storeroom that had been there for a long time; "how would it be to give the *just loafers* some for a treat?" So, the "float" was born. A float was, at that time, the name of a popular drink; the composition was charged water in a tall glass upon which brandy was poured gently so that the brandy would stay on top and the drinker would enjoy the mingling of the two fluids. However, the float given the "loafers" was not that kind but consisted of rich brown, cod liver oil upon which floated red pepper and quinine. This reduced the sick call to those who really were ailing, and seldom more than thirty came any day.

In Stillwater, as elsewhere, typhoid was very prevalent, and early recognition was desirable when possible. Helpful in this was the diazo-reaction just coming into use. The visiting doctor brought some specimens of urine for examination and in several, this reaction indicated typhoid, and when this proved correct, some of the other doctors sent some specimens, too. I became interested in these cases and inquired about the water and milk supply, traced these and found out that many of the cases appeared along the route of certain milk wagons and that the cows donating the milk for these wagons were watered at Lake McKusick—and thereby hangs a tale. One day, while down town, one of the "City Fathers" stopped me and, in no uncertain terms, told me to lay off on that typhoid stuff.

A few of the inmates were surgical subjects and the hospital was now fairly well equipped for a few of these cases. One was a tuberculous ankle, so badly diseased that amputation was necessary and was done. During the legislative

session in 1895 a legislator made the charge that arms and legs were cut off prisoners for rheumatism. An investigation was ordered and held at the State House. The hearing was conducted by Judge Flandrau; when the diseased ankle and foot were shown and the evidence gone over, the Judge promptly discharged the case, after making a few very caustic remarks (and he could be caustic) about the complaining legislator. However, this individual got his last say-so and revenge by having some regulations established whereby any prisoner requiring a surgical operation must have a guardian appointed who must give his full consent before an operation could be done. How long this ruling was in effect, or whether it still is, I do not know.

After leaving the prison, I joined the regular profession as a practitioner in Stillwater. This was in the so-called "Horse and Buggy Days," an expression intended to emphasize the hardships doctors who indulged in country practice had to put up with, although I did not find it so very hard when one could get around with a horse and buggy; but with a horse and sleigh in January, February, March, and into April, the going was really tough and sometimes dangerous. Many of the old fellows, still in practice, could, if they would, tell of experiences that required courage and devotion to duty.

At that time about twenty-one men practiced "the healing art" in Washington County. Most of them were regulars, with three homeopaths and one eclectic. Some of them were not graduates in medicine but had exemption certificates. Several midwives were also on hand, and they were quite busy, too, giving "first aid." Doctors' offices were not then, as now, well equipped. A few chairs, a desk and swivel chair, an examining table, and sometimes a bookcase, made up the furniture. Other professional requirements consisted mostly of a few surgical instruments, in which was included an amputation set, bandages, dressings, fracture splints or material for making them, some tablets, carbolic acid, and sometimes H_2O_2 , also an alcohol lamp, nitric acid, Haines solution, and two or three test tubes. For calls he had a medicine case, usually well supplied, a pocket instrument case containing a few needles, sutures, a pair of scissors, a "Bistoury" and in his upper vest pocket a thermometer. His obstetrical case was usually the best looked after and most frequently used. His

REMINISCENCES—BOLEYN

medical library was conspicuous rather for its near-absence: a Gray's Anatomy, a volume or two on surgery, practice of medicine, diseases of children, gynecology, obstetrics, and rarely a medical dictionary. The treatment of wounds consisted of washing with soap and water or irrigating with a carbolic acid solution, not always well shaken up (in pus cases, peroxide), and was usually topped off with a generous sprinkling of iodoform. The surgeon's hands or instruments were given no special attention. The antiseptic principles or rules (this was the antiseptic age) were not well understood. As an example: an old doctor practicing in the southern part of the country, took a patient to a Saint Paul surgeon for an abdominal operation. At the operation some interesting conditions were disclosed which the operator wanted the old doctor to palpate, so he said, "Scrub up and sterilize your hands and feel of this," to which the old man answered, "Oh, I did that before I left, early this morning."

Vaccination and quarantine for some of the communicable diseases were the only preventive measures known or practiced. Typhoid, tuberculosis, diphtheria, pneumonias, influenza, scarlet fever, and measles were the most common ailments and were treated symptomatically with nursing of the most primitive kind. The death rate was quite high, especially in diphtheria. This terrible scourge was given, beside internal medication and diet, heroic local attention by painting affected parts, if reachable, with strong solutions, gargles, sprayings, inhalations and forceful detachment and removal of the false membranes as they formed, and intubation, all too often of no use. The helplessness in these cases was only

relieved when antitoxin came into use and its prompt and miraculous effect demonstrated.

I think this was largely responsible for a less suspicious attitude toward newer therapeutics and the many new scientific discoveries now becoming available for practical use. These bewildered the old fellows, as they found it hard to understand them and, besides, were chary in displacing the Old for the New, or, rather, unable to adjust themselves to the New. The younger men, more alert, better educated, easily and eagerly fell in line with anything that proved beneficial and practical.

It is well to remember that, up to quite recent times, the practice of medicine was comparatively unscientific. There were not, as now, well equipped hospitals or richly endowed institutions for highly technical research at the beck and call when help in difficult or obscure cases was needed, nor, perhaps, the willingness of the people to submit to such had there been, as a suspicion toward anything out of the ordinary—unless it were a gold brick—was then harder to overcome.

If now, in 1942, when MINNESOTA MEDICINE celebrates its twenty-fifth anniversary and reviews the wonderful advancements in medicine toward a science, we feel inclined to be amused at what has gone before or those who practiced it, keep this in mind, that the therapeutics of today may be out of date and amusing tomorrow. Therefore, let us think of these old fellows, now no more, as honest, kindly, efficient for their time, and doing pretty good work with what they had; let us bare our heads and reverently intone "*Requiescat in pace.*"

ARMY DOCTORS IMPORTANT

Military doctors play a decisive role in war between nations and in mankind's peacetime fight against disease. Their triumphs in both kinds of war were reported by Col. Edgar Erskine Hume, of the Army's Medical Field Service School at Carlisle Barracks, in a public lecture at the New York Academy of Medicine.

"Half a million men can turn the tide of a war, even in these days of huge armies," Col. Erskine declared. The United States, he pointed out, might have had that number of men put out of action in World War I, not by enemy guns but by a single disease—if our Army had not been effectively protected against typhoid fever. In the first World War there were only 1,500 cases of typhoid fever instead of half a million as would have been expected on the basis of the numbers affected by this disease in our war with Spain in 1898, before doctors knew how to vaccinate against typhoid fever.

"In all past wars disease has struck down more soldiers than all the combined effects of the enemy's weapons," Col. Hume declared. "The soldier's duty is to fight, not to die, for his country. The Army's medical department has the task of keeping him fit, 'To Conserve Fighting Strength,' to quote the motto of the Medical Field Service School, Carlisle Barracks, Pa."

Recalling that the disastrous ending of Napoleon's Russian campaign was the result of an outbreak of typhus fever, to which the Russians were immune but the French and their allies were not, "Who knows but what something of this kind may not happen in the present war in Russia?" Col. Hume asked.

"Horrible though war is, it has stimulated medical advances," he continued. "Some of the world's great medical discoveries have been made by military surgeons, particularly in connection with field service. Every war has added to the sum of medical knowledge." —*Science News Letter*, December 19, 1942.

GROUP HOSPITALIZATION

ARTHUR M. CALVIN, Executive Director
Minnesota Hospital Service Association
Saint Paul, Minnesota

"Group Hospitalization," practically an unknown term nine years ago when the Minnesota Hospital Service Association was organized, is now a nationally understood phrase, as familiar to the every-day citizen as it is to the medical profession and to hospital personnel.

In less than a decade, group budgeting of hospital care has become nationally significant. Today, 11,000,000 persons throughout the United States are budgeting their hospital bills through seventy-six non-profit Blue Cross Plans for hospital care. These plans operate on a voluntary basis and are approved by the American Hospital Association.

Employed persons of limited means, reluctant to receive free or part-pay hospitalization, who formerly made valiant efforts to pay their hospital bills from limited resources, have welcomed enthusiastically the development of these non-profit plans which enable them to budget their hospital service conveniently in regular payments.

The Minnesota Hospital Service Association is a pioneer in the group hospitalization field, being the second oldest and the fourth largest of the Blue Cross Plans.

In 1933, when seven Saint Paul hospitals organized this plan, the medical profession of Minnesota, with characteristic foresight, took an active interest in its development. Various aspects of the plan were freely discussed by the hospitals and the medical profession and these discussions were printed in the early issues of **MINNESOTA MEDICINE**.

Because of the attitude of kindly interest of such men as Dr. Carl B. Drake, editor of **MINNESOTA MEDICINE**, who, with many others in the medical profession, believed that a group hospitalization plan could be carried out without interfering with the relationships of patient and doctor, the Minnesota Hospital Service Association has been able to develop rapidly.

Operating on a voluntary basis, the plan has proved to be of tremendous value; first, to the patient; second, to the hospitals; third, to the medical profession, and fourth, to the community.

Today, after nine years of public service the

Association's Blue Cross Plan is no longer an experiment. It has definitely proved that non-profit group hospitalization plans can be financially sound and that actuarial experience on the number of subscribers who may be hospitalized and the amount of care they may use, can be computed.

The Minnesota Hospital Service Association, which started with seven hospitals, now has 109 affiliated hospitals throughout the state, which are most cordial in their relationships. The hospitals do not receive profit from the plan, but are assured of prompt payment for hospital service rendered to Blue Cross Plan patients, just as the subscriber is assured of prompt and adequate hospital care when he is ill.

At the present time, 507,000 persons in Minnesota (one person in every five) subscribe to the Blue Cross Plan. The enrollment is distributed as follows: 366,000 in the Twin Cities; 50,000 in Duluth; 91,000 in the rest of the state. Through the coöperation of the Minnesota Farm Bureau, 25,000 farmers and their dependents have been enrolled. It is estimated that by the end of January, 1943, 515,000 persons in the state will be budgeting their hospital care through the Blue Cross Plan of Minnesota.

The outstanding enrollment record of the Plan is surpassed only by its record of service to subscribers. One thousand subscribers are in affiliated hospitals daily. Since 1933, 220,000 subscribers have received hospital care amounting to \$6,653,000.00. In the last nine years 26,000 babies have been born to Plan subscribers who have benefited under the maternity clause in the Association's contract.

During 1942, alone, the Plan will pay nearly \$1,750,000.00 to its affiliated hospitals for the care of its subscribers.

Through the Blue Cross Plan, hospitals can render greater service than ever to their communities, for when the financial hazard is removed, more people can avail themselves of hospital care when they need it.

Today, with our nation at war, it is imperative that people be able to avail themselves

GROUP HOSPITALIZATION—CALVIN

promptly of hospital care, and so take care of their health, for millions of work days each year are lost through illness. The Government has recently commended the Blue Cross Plan, for it recognizes the contribution the Plan is making to the war effort by helping reduce the number of work days lost through illness. According to national statistics, Blue Cross Plan patients stay in the hospital two days less than other patients. This is because, with the financial hazard removed they seek hospital care earlier and consequently return to normal life and to work more rapidly. It is estimated that in 1942 alone, over 2,000,000 work days will be saved the nation in this manner.

Minnesota's Plan today enjoys financial soundness, but prolonged or unnecessary care to subscribers can quickly and greatly jeopardize this soundness. It is in this respect that such a plan is dependent upon the medical profession who can control, to some extent, a subscriber's need for hospital care as well as the length of time over which he will need such care.

The Minnesota Hospital Service Association's accomplishments in the group hospitalization field were recently acclaimed by officials in medical, hospital, and government circles. At a dinner in October, 1942, celebrating the enrollment of the one-half millionth subscriber to the Association's Blue Cross Plan, Governor Harold E. Stassen remarked:

"This program of the Minnesota Hospital Service Association is a splendid example of a democratic method to solve a problem of community interest. The state has an obligation to coöperate with an organization of this type and has so demonstrated in the past. The totalitarian way of life is for the state to do everything and the people to follow its dictates. Our democratic way of life is for the people to solve their problems in a voluntary way with the utmost co-operation of the government and not for the government to do it all.

"If the government was to carry out a plan of this type it would cost considerably more to administer the plan and it would take a greater number of employes. I wish to congratulate this organization on the service it is rendering to the people of Minnesota."

On this same occasion, the Plan received congratulations from such national figures as Thomas Parran, Surgeon General of the United

States; Cordell Hull, Secretary of State, and James Forrestal, Acting Secretary of the Navy. Surgeon General Parran's letter read:

"The Minnesota Hospital Service Association has made a splendid contribution to the conservation of the nation's health in wartime through enlisting a half million members under the Blue Cross Plan.

"Prompt hospital care in sickness and injury will do much to reduce the time lost because of disability in our war industries.

"Please accept my congratulations on your achievement."

A telegram from Cordell Hull stated:

"I am glad to extend my felicitations on this fine record of public service and to send best wishes for the continued success of your Association in the future."

James Forrestal, Acting Secretary of the Navy, commented:

"It is a cause of genuine gratification to our United War effort and to me personally to learn that Minnesota has successfully completed the enrollment of half a million of the good citizens of your state in your Blue Cross Plan.

"The maintenance of sound bodily health is a tap root of national ability to survive in this vast planetary try-out of the quality of whole peoples. But, more than that, your Association brings an opportunity to many thousands of citizens to work together in an unselfish cause, whatever be their other tasks or affiliations, and this in itself is a vital factor no less important than the more obvious physical objectives you have in view.

"Please accept for the Minnesota Hospital Association my very true congratulations and my best wishes for the continuance of a good start towards a communal unity demonstrated by daily work."

The great strides that the Minnesota Hospital Service Association has been able to make in the group hospitalization field could never have been made if the Plan had not received splendid coöperation from physicians, hospitals, nurses, group leaders, employers, labor and civic leaders, clergymen, public officials, the radio and the press.

With the continued coöperation of these forces, the Blue Cross Plan will not only continue to develop and to render valuable service to the people of Minnesota, but it will also continue to be a leader in the group hospitalization field.

CLINICAL-PATHOLOGICAL CONFERENCE

MINNEAPOLIS GENERAL HOSPITAL

A. J. Hertzog, M.D., and S. V. Loosness, M.D.
Pathologists

Presentation of a Case

DR. MITCHELL: This case is that of a forty-two-year-old colored woman who was admitted to the Minneapolis General Hospital on October 23, 1942, in an unconscious state. The history was obtained from her husband. She had been employed in a laundry as a steam presser, and her past health had been good. On October 21, two days prior to her admission, she was suddenly seized with severe epigastric pain that was followed by nausea, diarrhea and a feeling of faintness. She was seen by a private physician who told her she had gall-bladder disease and gave her some medicine. However, her condition became worse, she vomited frequently, her eyes became yellow, the epigastric pain persisted, and she became confused. Shortly before admission she became unconscious.

Physical examination on admission revealed a well-nourished, well-developed negress in coma. Her temperature was 99.4 degrees by rectum, her pulse rate 110 per minute, and her breathing was labored. The sclerae were yellow and the skin showed evidence of jaundice. Examination of her heart and lungs was negative except for a soft systolic murmur over the aortic area. The liver was enlarged and extended 4 cm. below the right costal margin. There was some rigidity of the abdominal muscles in the epigastrium. The remaining examination was negative.

Laboratory examination revealed her hemoglobin to be 86 per cent. Her leukocyte count was 5,000 with 92 per cent neutrophiles. Rytz and Kahn tests were negative. Urinalysis showed dark brown urine with two plus albumin, nine to ten red blood cells and two to four leukocytes per high power field. Her icterus index was 60 units, and van den Bergh test gave a prompt direct reaction. A serum amylase test showed 281 Comfort units. Her blood sugar was only 35 mg. per cent, and the carbon dioxide combining power was 42 volumes per cent. The prothrombin level was 76 per cent, and total cholesterol was 236 mg. per cent.

The patient was given glucose intravenously and treated symptomatically. Following the glucose, the blood sugar rose to 220 mg. per cent and she quickly recovered consciousness. She vomited almost continuously during the first twenty-four hours of her admission. Her vomitus during this time was approximately 2,000 c.c. After that, duodenal suction was instituted and a moderate amount of fluid was aspirated which was positive for occult blood, but was negative for bile pigments. The vomitus had a fetid odor. On October 26, her blood urea nitrogen was 52.5 mg. per cent. A stool specimen was obtained with difficulty, and was clay colored. It contained only a trace of urobilinogen. The icterus index rose to 83 units. A

twenty-four-hour urine specimen showed bile, but a quantitative urobilinogen determination showed only a trace. She again became comatose. A blood urea nitrogen on October 29 was 155.4 mg. per cent. Her temperature rose to 104.8 degrees and she expired on October 31, the eighth day of her admission and ten days after the onset of her illness.

DR. HERTZOG: This case presents a diagnostic problem and has many interesting features from the laboratory standpoint. We have a forty-two-year-old negress who apparently was well until ten days prior to her death. She was admitted in coma with a history of severe epigastric pain. I imagine acute pancreatitis was considered as a serum amylase test was done. However, the results were within the upper limits of normal. An elevated serum amylase level is very helpful in the diagnosis of acute hemorrhagic pancreatitis. She was jaundiced. Slight jaundice is hard to recognize in a negro. However, her icterus index was 60 and later rose to 83 which represents rather severe jaundice. The findings in the urine and stool were that of an obstructive jaundice. A van den Bergh gave a prompt direct reaction as found in obstructive jaundice. However, we have to keep in mind that in obstructive or regurgitation jaundice, the obstruction may be intrahepatic as well as extrahepatic and often the laboratory is of little help in separating these two types of obstruction. Liver biopsies done with a small trocar, with little discomfort to the patient, may prove useful in these cases. The elevated urea nitrogen was probably extrarenal in nature associated with vomiting and dehydration. Mann showed that after the removal of the liver in dogs, the formation of urea ceases with a resulting drop in the level of urea in the blood. Hence, in severe uncomplicated liver damage, one would expect a drop in blood urea rather than an increase. The amino acids, however, may be increased as the normal deamination which occurs in the liver is stopped. There is a case reported in the literature where uremia as the result of tubular kidney damage, followed traumatic lacerations of the liver. The relationship between the liver and kidney pathology in this reported case is not clear. Theoretically it would be possible for the kidneys to be damaged by the same toxin that destroys the liver.

DR. PEPPARD: I would think of liver disease, although I do not think the story is quite the usual one for acute atrophy of the liver. There certainly is not anything to suggest the diagnosis of pancreatic disease.

DR. MOOSNICK: We were unable to get a history of the patient having taken any toxic drugs. The mucous membranes showed no evidence of any burns.

DR. HERTZOG: Dr. Mitchell will now give the autopsy findings.

DR. MITCHELL: The body was that of a well-developed, well-nourished negress. Although the skin

CLINICAL-PATHOLOGICAL CONFERENCE

was dark, definite jaundice could be recognized. The peritoneal cavity appeared normal. The liver was flush with the costal edges. The liver weighed 1,600 grams. The capsule was smooth and it had a bright yellow color. On section, the liver was smooth and soft, with a bright yellow color. The centers of the lobules were red. The gall bladder appeared normal and the bile ducts were patent with no evidence of any obstruction. The gastro-intestinal tract appeared normal except for severe superficial erosion of the mucosa in the terminal portion of the esophagus. This did not extend into the stomach. The kidneys weighed 200 grams and 280 grams each. Their surfaces appeared swollen and bile-stained. The mucosa of the urinary bladder was hemorrhagic. The spleen was of normal size. The heart and lungs showed nothing of note other than confluent bronchopneumonia in the lower lobes of the lungs.

DR. LOFSNESS: I will show the microscopic slides in this case. Grossly, the liver resembled severe fatty metamorphosis but microscopically one sees severe necrosis of the liver parenchyma. The central portions of all of the lobules are necrotic. Only a few viable liver cord cells are seen at the periphery of the lobules. There is also some bile pigment in these parts of the lobules. A great deal of liver tissue has been destroyed. There is no evidence of repair, bile duct proliferation, or fibrosis. The spleen shows only congestion. This section of the lung shows pneumonia, with fibrin and leukocytes filling most of the alveoli. The glomeruli and blood vessels of the kidneys appear normal. However, it has to be remembered that the glomerular capillaries can leak proteins and give albuminuria from a trivial injury with no histologic changes. Some of the collecting tubules are filled with pink granular material as seen after transfusion reactions. There is no history of any transfusion to account for this. If the substance is hematin, it could be due to hemolysis. The tubular epithelium appears intact.

DR. HERTZOG: The histologic picture in the liver that Dr. Lofness pointed out to you is typical of acute degeneration of the liver. The term "acute yellow atrophy" is often applied to this type of liver disease. The name is really a misnomer, as frequently the liver is larger than normal and red in color, rather than yellow. Hence the term, acute degeneration, is preferable. The urine in these cases at times may contain leucine and tyrosine crystals. Some of the chronic cases may develop eventually a type of cirrhosis that is difficult to distinguish from the ordinary type of portal cirrhosis. The mild cases that recover are usually called acute catarrhal jaundice. The findings in the kidneys are not sufficient to account for the elevated blood urea nitrogen. The uremia appears largely due to

extrarenal factors. The patient vomited a great deal and lost considerable fluid during the first part of her hospital stay. An esophagitis is frequently seen at post-mortem in a patient who has regurgitated the acid stomach contents prior to death.

DR. MOOSNICK: Does this liver look like those found in severe alcoholism?

DR. HERTZOG: No, in chronic alcoholism the usual finding is a fatty liver.

DR. LOFSNESS: Acute degeneration of the liver is an uncommon disease of unknown etiology. Some cases occur during pregnancy, and some are due to drugs such as sulfanilamide, neo-arsphenamine, chloroform and cinchophen. Occasionally it follows extensive burning of the skin or thyrotoxicosis. Many cases, however, such as this one, are not well understood. They tend to occur in younger people, often have an abrupt onset, with no known precipitating factor. The principal lesion is autolysis of the liver. This suggests death or injury of the hepatic cells without inactivation of the intracellular enzymes. Chemicals such as chloroform, toluene and salicylic acid will do this. Substances such as strong acids, phenol and formaldehyde kill cells but also inactivate fermenters and consequently fix tissues, preventing autolysis.

On a few occasions, biopsies of the liver have been taken from people with acute hepatitis. The main change is swelling of the liver cells. This narrows the sinusoids, reducing the blood flow, and consequently the oxygen supply. Anoxemia favors acidosis, as seen in an overworked muscle, or excised tissue. Slight acidity will kill cells, as seen in tissue culture. Also, the intracellular pepsin-like enzyme acts best in an acid environment. Inasmuch as the centers of the lobules have the poorest blood supply, they usually are most severely attacked. Recent studies suggest that blood flow in the liver is influenced by valve-like musculature around the sinusoids under nervous control, and this may be concerned.

In any event, the lysed cells liberate protein cleavage products into the circulation, such as albumoses and amines, which are highly toxic. Amino acids are formed, appear in the blood in excess, and are excreted in the urine. Also, the damaged liver is unable to stabilize the blood sugar, so that hypoglycemia occurs frequently. You will recall that our patient entered with hypoglycemic coma. It seems that the malignant course of this disease is due more to the toxins formed by autolysis, and the loss of hepatic function, than to the precipitating toxin.

Anatomic Diagnoses: (1) Acute degeneration of the liver; (2) bronchopneumonia; (3) acute esophagitis; (4) jaundice.

LOWEST DEATH RATE FROM PNEUMONIA REPORTED

The lowest pneumonia and influenza death rate on record among its industrial life insurance policyholders was achieved in the last annual cycle, September, 1941, to August, 1942, the Metropolitan Life Insurance Company announces.

During that period the average pneumonia-influenza death rate was equivalent to 32 deaths per 100,000 persons. This is 21 per cent less than the previous low record made the year before and 63 per cent less than the rate five years before.

Most striking is the change in the picture during the winter months when pneumonia and influenza deaths reach their maximum. During the winter of 1936-1937, considered an average winter at that time, pneumonia and influenza deaths reached an extremely sharp peak in February with a rate of more than 175 deaths per 100,000 persons on an annual basis. At the end of February, 1942, the peak was just over 50 deaths per 100,000 persons on the annual basis. The death rate for the winter months was 70 per cent less than in the winter of 1936-1937, and the seasonal mortality curve has flattened out so as to be "almost beyond recognition."

The life insurance company warns, however, that the continued prevention and control of pneumonia is the concern of every man and woman and that no common cold can be considered lightly. Signs or symptoms of more serious trouble call for prompt medical attention.—*Science News Letter*, December 19, 1942.

HISTORY OF MEDICINE IN MINNESOTA

THE ASIATIC CHOLERA IN SAINT PAUL

JOHN M. ARMSTRONG, M.D.
Saint Paul, Minnesota

(Continued from December Issue)

The Board of Health made its first report to the Council on June 11. The fact that such a report was made is all that is preserved in print of the activities of that body and this statement in the minutes of the Common Council is the only official record of the cholera in Saint Paul until the succeeding epidemic, which will be taken up later. It must be remembered that it was feared that the fact that cholera existed here might get abroad and deter immigration. Knowledge of the matter was kept as quiet as possible. Immigrants meant business and money, and both were sorely needed here. The Council, then, when receiving reports from the Board, tabled them; thus the report did not appear on the minutes and even the newspapers did not print them and almost ignored their presentation. This attitude of the city government and newspapers in regard to epidemics is still often followed. The report, as I have stated, will not be found in the printed record. Fortunately, through the courtesy of the custodian of the Courthouse some years ago, I came upon the written minutes. Subsequent reports could not be found. The report is as follows:

"The Board found a young man sick on Third Street with the disease which has been prevailing to a moderate extent among immigrants upon the decks of our steamboats, to whom due aid and comfort was administered, and as soon as he was sufficiently recovered to be removed, he was provided with comfortable quarters. He is now very nearly well. A man named _____, an Irishman, in a dying condition when the Board organized, was visited and after death his remains had decent sepulture, through the instrumentality of the Board and Mayor Olmsted. A German of the name of Frederick Altman, was found in a dying condition yesterday morning in the suburbs of the city and was removed to the home of a benevolent citizen nearby where he had the best attention of the inmates of the domicile and the Board while he lived. He died last night and was buried today."

The Board also stated that they had been unable as yet to procure a building for a hospital. Bishop Cretin then made the Board a proposition as follows: "That the city could have the use at reasonable expense, of ample apartments in the hospital now in process of erection under his superintendence as soon as it was finished, which he thought would be by the first of July." St. Joseph's Hospital could not be used, however, and it was imperative that a building be secured at once. The old log chapel of Saint Paul, erected in 1841, at this time being used as a school by the Sisters of St. Joseph, was secured, and shortly after this event, opened as a cholera hospital.

When the steamer *Galena* drew up to the landing in Saint Paul early in the morning of June 16 she had nine ill with cholera aboard, one patient, a cabin passenger, in extremis. He was carried to Doctor Goodrich's office where he expired at 9 a.m. He was a physician named A. Sargent of Meadville, Penn-

HISTORY OF MEDICINE IN MINNESOTA

sylvania.² Most of those who died or who had the disease in Saint Paul were strangers so that their names are not remembered and were in many instances unknown. Saint Paul citizens did not entirely escape. Among the latter was Col. Daniel H. Dustin, United States District Attorney. He was orator of the day on July 4, was taken ill a few days later and died on the tenth at the Winslow House (where the Forepaugh Block now is at Seven Corners). An infant daughter of his died a few days later at the home of Samuel Abbey.³ On June 19 the fifth death occurred in one family in Upper Town, name unknown, and another member of the family was stricken. On July 25 there were two more deaths, one a Miss Bridgit and the other Dr. Charles Ludwig Vicchers,⁴ who contracted the disease from a man he was attending. He lived but five hours after the onset of symptoms. The daughter of The Reverend Van Ingen, rector of Christ's Church, was taken ill with cholera when the steamboat she was on was ascending the river opposite Kaposia. She died a few days later.⁵ On July 22 Charles D. Fillmore, a half-brother of ex-president Fillmore, died of dysentery, the papers stated, as no doubt his obituary would be widely circulated. He was stricken with cholera while driving from Saint Paul to Stillwater but managed to get back to town before he died.⁶ Three days later a child named Hoffman and a niece of Fillmore's wife died of the same disease. After Fillmore's death, whenever a livery team started out to be gone for several hours it was customary for the livery man to put a bottle of cholera medicine under the seat of the vehicle. The popular cholera medicine among the people was Perry Davis' Pain Killer, a mixture of whiskey, tincture of opium and tincture of capsicum. It was taken internally and also applied to the abdomen. On August 2, two persons, Edward K. May, a prominent merchant, and an unknown woman died. On July 25 the steamer *Galena* again brought cholera patients into the city and several deaths had occurred on the boat on its way up the river. My mother, who came to Saint Paul the last day of July, tells me that a man died of the cholera at the Winslow House shortly after her arrival. He and his wife had just arrived from the South on their wedding trip. Doctor Potts was the man's physician. My mother's aunt, later Mrs. Willis A. Gorman, volunteered to care for the man while my mother endeavored to render consolation to the young wife.⁷ A servant in the home of Judge Sherburne was found ill in bed one morning with cholera. Dr. A. G. Brisbne was called. He secured a Sister of St. Joseph to care for her but she died the same evening.⁸ There were nine in the Sherburne family and two other servants, but none of them contracted the disease.

Much more, no doubt, could be added to this account, had this investigation been undertaken forty years ago instead of recently. Possibly my mother is the only person now living who has personal recollection of the cholera in Saint Paul in 1854. It would seem that there was considerable more cholera in Saint Paul than most people would now believe, as I certainly have been able to

²Doctor Sargent was accompanied by his daughter. In October, a Mr. Kennedy came to Saint Paul to take Sargent's body back to Meadowville for burial.

³Both Dustin and his daughter were attended by a homeopathic physician named Geo. A. Sperry. Sperry left Saint Paul some years later. Samuel Abbey's house was on Fourth Street about where the entrance to the J. J. Hill Library now is. Later the house was removed and is now part of a building at 181 Ramsey Street. Doctor Potts succeeded Sperry and was attending Dustin when he died.

⁴Doctor Vicchers came a year previously. He married a Miss Coulter in Saint Paul. His widow married again and died in about 1912 at Fargo, N. D.

⁵She was returning home from the East where she had been at school. The clerk on the boat named Cochran did what he could for her until Saint Paul was reached. She was buried in the Mission Grounds (now Park Place).

⁶Fillmore was United States Commissioner of Pine Lands in Saint Paul.

⁷My mother was then sixteen years of age. She states that the day the man died, *Harpers Magazine* had just come; Thackeray's "The Virginians" was running in it and she did not get a chance to read it. Later in the year, my grandmother returned to Canada to bring the household goods here. She was taken ill with the cholera at Galena but recovered. Mrs. Armstrong, my mother, died in 1940 at the age of 102.

⁸This was the first time Miss Sherburne met Doctor Brisbne. She later became his wife.

HISTORY OF MEDICINE IN MINNESOTA

gather but a portion of the facts. During the year the Common Council passed bills incurred by the Board of Health amounting to \$1,046.42, including the salary of \$300 of the city physician. The above statements apply to the year 1854. I have several accounts of the disease which may have occurred either in 1854 or 1855, but in most instances the date cannot be definitely fixed. There is reason to believe, however, that the disease was more prevalent in 1855 but there are only two references to it in the newspapers of that year and none in the minutes of the City Council, no doubt for reasons previously stated.

Apparently the epidemic of 1854 caused the editor of the *Minnesota Democrat* to write an editorial on Health and Crowded Boats, the last paragraph of which is as follows: 'We do not wish to be misunderstood at a distance in making these remarks. *There is no sickness in Saint Paul now.* There has been very little on the river. We desire simply to secure the enforcement of proper sanitary regulations in the city and upon steamboats, for the protection of present and future residents and visitors either upon pleasure or business.' This was in the issue of April 25, 1855. The warning evidently had its effect, for on May 1, the New City Council elected the following to serve on a Board of Health: P. R. Winne, L. C. Dunn, N. F. Masterson, Isaac Markley, A. H. Caver-
der, and D. A. Robertson. These men nominated Dr. Samuel Willey for city physician. The nomination was approved by the Council, which also passed a resolution thanking Doctor Goodrich for his previous services.

That the Board at once found work to do is evident, for the next day the following appeared in the *Democrat*:

"A young printer named Daniel E. Berry, from Harrisburg, Pennsylvania, died this morning at the hospital from cholera. Mr. B. came to Saint Paul yesterday on the Ben Bolt from Dubuque. When he was attacked by the cholera, he was turned out of the hotel . . . the sick man laid down on the pavement until his companion secured aid, when he was carried to Doctor Lambert's office, and thence to the hospital."

The editor's indignation at the inhumanity of the hotel keeper was no doubt intensified because Berry came to Saint Paul to work for the *Democrat*. The other reference to cholera occurs in the same paper on May 9:

"We announce this evening with feelings of sincere regret the death of Mr. Platt, one of the editors and proprietors of *The Minnesotian*. Mr. Platt expired this morning at his residence in this city of cholera-morbus after an illness of thirty-eight hours . . ."

This was Henry P. Platt. Other sources of information leave no doubt that his demise was due to Asiatic cholera.

I shall now quote two or three interviews of the many I have had with old settlers, which illustrate the manner in which much of this material was obtained and how authenticated. In August, 1915, I had an interview with James Cody, then living on Smith Avenue near Ramsey Street. Cody was illiterate, but had a keen memory. That part of his statement relating to the cholera I give in his own words:

"I came to Saint Paul, May 1, 1854. The cholera was here at its worst in 1854 and 1855. Margaret, my sister, aged twenty-five, died of cholera at St. Joseph's Hospital May 1, 1855. James Farrell died the same week. In 1854, Fillmore went out for a drive into the country and came in and died. At the Cemetery at the Academy grounds (where St. Joseph's Academy now is) was a blackboard where the names of those dying of cholera were written. I counted thirty-four names in two weeks. On a raft on the river where the Wabasha bridge now is, a man died in a short time. In June, 1855, Andrew Welsh

HISTORY OF MEDICINE IN MINNESOTA

died and willed all to wear a white scarf at his funeral. Dan Welsh died also; he was no relative to Andrew. The cholera was worse in 1855 than in 1854. Doctor Willey was the best doctor we had. Doctor Goodrich was a good doctor. Mary Anne Ireland, half sister to the Archbishop, recovered from the cholera in 1855. Of Tom Farrell's family, James died and Pat recovered. At St. Peter and Summit was a French Catholic Cemetery—a French woman was buried there in 1854. She had cholera. The funeral cost seventy dollars. Many cholera patients died at St. Joseph's Hospital. Bishop Cretin said a committee must help the Sisters, and the night my sister died, many were sick at the hospital. I helped there myself. Doctor Goodrich had charge of the cholera patients in 1854. Every boat that came brought in patients. James Farrell died at Tom Grace's near Park Place. Hannah McQuaid died about the same time at her home on Jackson Street, near Sherries. James Ryan died after breakfast at the same time. In May, Father Tom McManus gave a sermon about a man who brought him word of a sick man aboard the *War Eagle* (a steamboat). The sick man recovered, but the messenger died. Mike De Warn, his wife, and two daughters died of cholera on Eagle Street. _____ Kay, daughter and son, twenty-five and twenty-seven (years of age), were taken sick on Sunday evening and died the next day. Dennis Lynch was digging the cellar of the old Jackson Street Methodist Church and died two hours after. In 1854, Wm. Murnan died of cholera above Lake Pepin on a steamboat, and his brother John died later. I was to a dance on Second Street in 1855, five took it at the dance and three died—Wm. Ryan, Miss Flaherty and Ellen Burke. John Donley, in Reserve township, was taken ill while cutting hay in 1855. Mayor Knowl died at Sixth and Robert Streets in 1855."

I may say that the Dennis Lynch mentioned was the maternal grandfather of the late Thomas J. Maloney, who graduated in the same class as myself at the University of Minnesota. Doctor Maloney's mother confirmed Cody's statement. On July 31, 1915, Mr. Jacob Mathes said:

"I came to Saint Paul in 1852. I remember the cholera in Saint Paul. I can recollect the name of but one man who died of it here. He was a German named Hullsieck. I think it was probably about 1855. I was living in Cincinnati in 1849 and 1850 and also remember the cholera there. Coal fires were lighted at the street intersections as a preventative."

Both these statements are interesting as the German named Hullsieck was John Gabriel Hullsieck, aged twenty-six, the great uncle of the two Drs. Richard and Harold Hullsieck, now in Saint Paul. As to the bonfires on the street corners in Cincinnati I may say that it was a revival of the procedure adopted as a preventive for the bubonic plague in London two centuries before.* Mrs. W. D. Richardson told me that she was living in what is now Park Place in 1855. One evening a woman, who lived on what is now Smith, about opposite the Miller Hospital, came to her home and asked that she procure help as her husband was ill. Mr. Richardson was attending a Masonic meeting in the Mouzurkia Hall on St. Anthony and Exchange. Mrs. Richardson went after him. He brought a physician from the lodge meeting with him, but the man died. He was an engineer on one of the steamboats. Mrs. Richardson said that there were many cholera patients in Saint Paul, but this was the only one with whom she personally came in contact. She looked after the woman's baby until after the funeral. She stated that the Board of Health, the Masons, and the clergy cared for many patients. Mr. Richardson was one of the Masonic cholera relief committee.

That there was some cholera in St. Anthony is proved by an item in the minutes of the Board of County Commissioners for July 24, 1854.

"Wm. E_____ (writing illegible) attending one cholera case at St. Anthony . . . \$10.00. Same . . . attending one cholera case at St. Anthony . . . \$10.00."

*It may be interesting to state here that the word "bonfire" was originally **bonefire**; that is, the fire in which the corpses of those who died of plague were cremated.

HISTORY OF MEDICINE IN MINNESOTA

St. Anthony was part of Ramsey County until 1875. Mrs. Mary A. Fuller, who was Mrs. Samuel Willey, told me that one boat in 1855 brought in eleven cholera patients.¹⁰ They were placed in wagons to be taken to St. Joseph's Hospital (which was in use in 1855). One of the wagons became mired and two patients died before it could be extricated. Mrs. Fuller (nee Irvine) came to Saint Paul as a child in 1843. It is unnecessary to multiply such accounts. Apparently there was little cholera after 1855, though Doctor Wharton told me he saw some patients on the river flats in 1857 or 1858.

In 1866, Saint Paul was again affected by the disease. The history of this outbreak has some amusing features. In April, the City Council ordered the city cleaned up in order to be prepared for a visitation of the disease, and at the same meeting a committee of the Council reported that the Pest House, located on the Poor Farm, had been sold with the rest of the farm and that they were endeavoring to secure a new site with the coöperation of the county. As will be seen, this complicated affairs. It was then discovered that no Board of Health or city physician existed, as none had been appointed since the new city administrators had come in. Thereupon, Dr. A. G. Brisbne was re-elected city physician and his salary fixed at \$150.00 per year, a considerable reduction. The Board of Health was then organized with a clerk and a representative from each ward. The Board met on April 18, and set about taking steps to clean up the city as per order of the Council. Earlier in the month, a sanitary police system had been perfected and an order issued, with the acquiescence of the Council, that there be no dumping in the streets, undrained pools of stagnant water in streets and vacant lots should be drained or filled up, no hog pens or soap factories be allowed within the city limits, green hides must not be left on the sidewalks to perfume the air and refuse and garbage must be dumped in the river below the city limits. However, when health ordinances conflict with business interest, political policies often change. The dumping below the city limits was protested against by those handling refuse because of the extra haul, and those who took water from the river for sprinkling the streets joined them saying they were afraid the sprinkling water might be contaminated. The hog owners then protested, claiming that pig pasturing within the city did no harm and pigs acted as efficient scavengers. H. Rogers, who was in the hide business, stated that he had been in the leather trade in Philadelphia in 1832, and that there was no cholera among those in the leather business or even in the vicinity of the warehouses where hides and leather were stored and that such a business was a protection to those engaged in it and to those residing near such business houses. Mayor Prince then refused to sign the sanitary ordinances and the Council did not pass them over his veto. The editor of *The Pioneer*, in an editorial, thanked the Council for their action, stating that "when the hogs were driven out and the hides confined, he could not sleep because he missed the odor, but now that the fragrance was again restored he could secure his normal sleep." The Board of Health thereupon tendered their resignations, but they were not accepted. The members then, except the clerk who drew a salary, did not attend the meetings and practically no Board existed, as no quorum could be obtained. Finally, in June, the resignations were accepted, and in July, Dr. Thomas R. Potts, after some competition with Dr. C. D. Williams, was elected city physician and health

¹⁰In 1854, that portion of the city bounded by West Fourth Street, St. Peter Street, Pleasant Avenue, and West Ninth Street was swampy. A stream ran down Rice Street and through the grounds of St. Joseph's Hospital and reinforced by waters from springs along Pleasant Avenue there was enough water to turn the wheel of Irvine's Mill at West Third and Franklin Streets. The arched stone tailrace of this mill may still be seen east of the steps heading down the bluff at that point. When one said upper town, one referred to that part west of the swamp and centering about the seven corners, the approach to the upper levee being Eagle Street. Lower town was east of the swamp and corners on Jackson Street, which was the approach to the lower levee. It was in the road through this swamp that the wagon conveying the cholera patients was mired.

HISTORY OF MEDICINE IN MINNESOTA

officer. In the meantime, the committee of the Council and the county commissioners could not agree and failed to provide a site for a hospital, but it was proposed to locate it in the third ward. This caused a panic in that part of town. A public meeting was then held and addresses were made by various citizens. Doctor Willey stated after the necessity for a cholera hospital had been admitted that "he thought St. Joseph's Hospital the best place; the city had had its cholera patients cared for there when the cholera was here before." Doctor Stewart also advocated this plan as "there was no time to build a cholera hospital and the cholera may break out any day. It had already appeared in Cincinnati and boats may bring it here any moment." Mr. Markoe offered to see what arrangements could be made for the reception of cholera patients at the hospital and report at a subsequent meeting. It was suggested also by Doctor Willey that daily reporting of cholera patients be required and reports of disease and mortality kept. This suggestion was taken up by the newly organized Board of Health and was the first ordinance of its kind in the state. This meeting was followed by a meeting at Timmes Grocery Store¹¹ of citizens who resided near the hospital and threats were made of burning the hospital if cholera patients were allowed there. It was then suggested that the Dakota House on the west side of the river be secured as a suitable place. Shortly after this meeting, I. P. Wright, chief health inspector, reported that he had rented the Dakota House on the west side of the river, but the residents of that locality had fiercely protested and Mr. Langevin, the owner, had begged him to give up the contract as he apprehended the hotel would be destroyed. So a site was secured at Kaposia. This again was given up for similar reasons. On August 21, the Board reported that they were building a quarantine station at Pig's Eye about a mile below Dayton's Bluff. "Two buildings, one 24 by 30 feet and another 30 by 30 feet, are almost completed, and bedding, stoves, furniture, and medicines will be sent down today." Boats coming up the river were to be required to stop there for inspection. On August 24, Dr. Charles E. Smith, a graduate of the University of Pennsylvania, who had just returned home after serving an internship at "Blockley," was made assistant to Doctor Potts, and placed in charge of the quarantine station. The two buildings cost \$1400.

¹¹At that time on the southwest corner of Tenth and St. Peter Streets.

(To be continued in February issue.)

HISTORY OF MEDICINE IN MINNESOTA

St. Anthony was part of Ramsey County until 1875. Mrs. Mary A. Fuller, who was Mrs. Samuel Willey, told me that one boat in 1855 brought in eleven cholera patients.¹⁰ They were placed in wagons to be taken to St. Joseph's Hospital (which was in use in 1855). One of the wagons became mired and two patients died before it could be extricated. Mrs. Fuller (nee Irvine) came to Saint Paul as a child in 1843. It is unnecessary to multiply such accounts. Apparently there was little cholera after 1855, though Doctor Wharton told me he saw some patients on the river flats in 1857 or 1858.

In 1866, Saint Paul was again affected by the disease. The history of this outbreak has some amusing features. In April, the City Council ordered the city cleaned up in order to be prepared for a visitation of the disease, and at the same meeting a committee of the Council reported that the Pest House, located on the Poor Farm, had been sold with the rest of the farm and that they were endeavoring to secure a new site with the coöperation of the county. As will be seen, this complicated affairs. It was then discovered that no Board of Health or city physician existed, as none had been appointed since the new city administrators had come in. Thereupon, Dr. A. G. Brisbne was re-elected city physician and his salary fixed at \$150.00 per year, a considerable reduction. The Board of Health was then organized with a clerk and a representative from each ward. The Board met on April 18, and set about taking steps to clean up the city as per order of the Council. Earlier in the month, a sanitary police system had been perfected and an order issued, with the acquiescence of the Council, that there be no dumping in the streets, undrained pools of stagnant water in streets and vacant lots should be drained or filled up, no hog pens or soap factories be allowed within the city limits, green hides must not be left on the sidewalks to perfume the air and refuse and garbage must be dumped in the river below the city limits. However, when health ordinances conflict with business interest, political policies often change. The dumping below the city limits was protested against by those handling refuse because of the extra haul, and those who took water from the river for sprinkling the streets joined them saying they were afraid the sprinkling water might be contaminated. The hog owners then protested, claiming that pig pasturing within the city did no harm and pigs acted as efficient scavengers. H. Rogers, who was in the hide business, stated that he had been in the leather trade in Philadelphia in 1832, and that there was no cholera among those in the leather business or even in the vicinity of the warehouses where hides and leather were stored and that such a business was a protection to those engaged in it and to those residing near such business houses. Mayor Prince then refused to sign the sanitary ordinances and the Council did not pass them over his veto. The editor of *The Pioneer*, in an editorial, thanked the Council for their action, stating that "when the hogs were driven out and the hides confined, he could not sleep because he missed the odor, but now that the fragrance was again restored he could secure his normal sleep." The Board of Health thereupon tendered their resignations, but they were not accepted. The members then, except the clerk who drew a salary, did not attend the meetings and practically no Board existed, as no quorum could be obtained. Finally, in June, the resignations were accepted, and in July, Dr. Thomas R. Potts, after some competition with Dr. C. D. Williams, was elected city physician and health

¹⁰In 1854, that portion of the city bounded by West Fourth Street, St. Peter Street, Pleasant Avenue, and West Ninth Street was swampy. A stream ran down Rice Street and through the grounds of St. Joseph's Hospital and reinforced by waters from springs along Pleasant Avenue there was enough water to turn the wheel of Irvine's Mill at West Third and Franklin Streets. The arched stone tailrace of this mill may still be seen east of the steps heading down the bluff at that point. When one said upper town, one referred to that part west of the swamp and centering about the seven corners, the approach to the upper levee being Eagle Street. Lower town was east of the swamp and corners on Jackson Street, which was the approach to the lower levee. It was in the road through this swamp that the wagon conveying the cholera patients was mired.

HISTORY OF MEDICINE IN MINNESOTA

officer. In the meantime, the committee of the Council and the county commissioners could not agree and failed to provide a site for a hospital, but it was proposed to locate it in the third ward. This caused a panic in that part of town. A public meeting was then held and addresses were made by various citizens. Doctor Willey stated after the necessity for a cholera hospital had been admitted that "he thought St. Joseph's Hospital the best place; the city had had its cholera patients cared for there when the cholera was here before." Doctor Stewart also advocated this plan as "there was no time to build a cholera hospital and the cholera may break out any day. It had already appeared in Cincinnati and boats may bring it here any moment." Mr. Markoe offered to see what arrangements could be made for the reception of cholera patients at the hospital and report at a subsequent meeting. It was suggested also by Doctor Willey that daily reporting of cholera patients be required and reports of disease and mortality kept. This suggestion was taken up by the newly organized Board of Health and was the first ordinance of its kind in the state. This meeting was followed by a meeting at Timmes Grocery Store¹¹ of citizens who resided near the hospital and threats were made of burning the hospital if cholera patients were allowed there. It was then suggested that the Dakota House on the west side of the river be secured as a suitable place. Shortly after this meeting, I. P. Wright, chief health inspector, reported that he had rented the Dakota House on the west side of the river, but the residents of that locality had fiercely protested and Mr. Langevin, the owner, had begged him to give up the contract as he apprehended the hotel would be destroyed. So a site was secured at Kaposia. This again was given up for similar reasons. On August 21, the Board reported that they were building a quarantine station at Pig's Eye about a mile below Dayton's Bluff. "Two buildings, one 24 by 30 feet and another 30 by 30 feet, are almost completed, and bedding, stoves, furniture, and medicines will be sent down today." Boats coming up the river were to be required to stop there for inspection. On August 24, Dr. Charles E. Smith, a graduate of the University of Pennsylvania, who had just returned home after serving an internship at "Blockley," was made assistant to Doctor Potts, and placed in charge of the quarantine station. The two buildings cost \$1400.

¹¹At that time on the southwest corner of Tenth and St. Peter Streets.

(To be continued in February issue.)



STEPHEN H. BAXTER, M.D.
President, Minnesota State Medical Association

President's Letter

A YEAR ago, a new president of our association took office only a few days after the treacherous Japanese attack on Pearl Harbor had precipitated a state of war. Before that attack, the United States was not at war with any nation; since then, our armed forces have been sent on missions of war to all parts of the world. Now, again, comes a change of administration, but it is in no sense a "change of horses in the midst of the stream." Responsibility for administration in our Association rests in a Council of members serving for overlapping terms, and representing every part of the state; but final authority rests in the truly representative House of Delegates. This mechanism provides a continuity of policy for the organization and gives to its elected leaders a sense of confidence and support which they as individuals could not possess. Without this support, any officers assuming positions of leadership in this year of grace, 1943, and approaching the problems with which they will be faced, must necessarily have many misgivings regarding their own adequacy; with it, they can go forward with confidence and assurance.

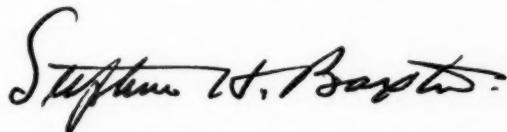
The nation is at war for its very life and every one of us has already felt the impact of the struggle. The war brings changes in the social and economic structure of the nation which vitally affect us all. Many of these changes will be permanent, for the old order will not return exactly as it was before the war. There are powerful forces at work which would destroy the practice of medicine as it is now conducted and would make the physician a hired employee of a bureaucracy. These forces should be and will be resisted, for experience has shown that scientific medicine reaches its highest development and accomplishes the greatest good for the greatest number of people under a free system unhampered by bureaucratic dictation.

Suppose, however, that the tide is irresistible, and fundamental and radical changes take place in the practice of medicine. The outlook could not be darker than was the outlook for Britain in 1940 when she was threatened with invasion and her cities were being bombed almost to complete destruction. During those darkest days, someone invented the slogan, "There will always be an England." The very repetition of that simple phrase engendered the faith that somehow it would come true, and inspired men to perform the works without which their faith would be dead.

If the threatened changes in medical practice become effective, will we be able to say "There will always be a medical profession?" True, there will always be physicians, for there will always be persons physically and mentally ill who will need the ministrations that only the physician can give, but there are many professions, each with its own ideals and code of ethics. My belief is that, regardless of the changes that may come in medical practice, there will always be a medical profession governed by the traditions of the profession and therefore essentially unchanged because those traditions are based upon principles which are fundamental to the character of the physician and to the best relationship between the physician and the patient. Our organization is one of the strongest forces contributing to the maintenance of that character and those principles, and it must be kept at the highest possible level of efficiency and influence.

With this inaugural expressing faith in the fundamentals of our profession and in the maintenance of its ideals, and with confidence in the future of medicine, the new administration assumes its duties.

Faith, to be vital and effective, must be implemented by works. The first of these works is to be found in the committee appointments. The work of many committees deals with scientific matters, the work of others deals with the relations of the medical profession to the public, and with matters affecting the economic aspects of medical practice. Both are important, and, in the final analysis, they both serve the same end which is to provide the best possible medical care through a well-trained and progressive medical profession. Practically every committee will be faced with problems which originate from, or are complicated by the state of war. The medical profession should take the lead in finding the solutions of these problems. Therefore the committees should attack them promptly and vigorously and have some concrete and well-considered recommendations to present to the annual convention to be held in Minneapolis in May.



President, Minnesota State Medical Association

Editorial

CARL B. DRAKE, M.D., *Editor*; GEORGE EARL, M.D., HENRY L. ULRICH, M.D., *Associate Editors*

EARLY DAYS

WITH this issue MINNESOTA MEDICINE begins the twenty-sixth year of publication. It must be quite obvious to every member of the Minnesota State Medical Association that the judgment of the House of Delegates in 1917 was sound in principle and fraught with farsighted wisdom. The journal had its inception with the appointment of a committee at the meeting of 1916, in Minneapolis. This committee consisted of Drs. R. J. Hill and J. Warren Little of Minneapolis, George E. Senkler and E. W. Buckley of Saint Paul, and C. L. Scofield of Benson, with instructions to determine the cost, the probable value of a journal to the society and to the profession as a whole, and to report at the next annual session.

At the 1917 meeting held in Saint Paul, a majority report was submitted, the substance of which was that owing to the existing state of war and the high cost of production it was deemed inadvisable at that time. A minority report submitted by Dr. E. W. Buckley of Saint Paul showing a most complete and careful study of the project was adopted by the House of Delegates. Following this, Doctor Buckley announced an offer of Ramsey County Society to present to the State Association the *Saint Paul Medical Journal* together with its advertising contracts and good will. This journal had had a successful career for seventeen years under the able editorship of Dr. Burnside Foster with Dr. H. Longstreet Taylor as business manager. The offer was promptly and gratefully accepted.

The first issue bearing the title of MINNESOTA MEDICINE went to the membership in January, 1918, and evoked many pleasing and gratifying comments. The *Journal of the American Medical Association* gave it a most complimentary editorial.

The first editor was Dr. E. T. F. Richards with Drs. R. E. Farr and J. E. Hynes of Minneapolis, E. W. Buckley and H. L. Taylor of Saint Paul and L. B. Wilson of Rochester constituting the first Editing and Publishing Committee. A contract had been entered into with

the Bruce Publishing Company and to the credit of this company be it noted has been renewed at intervals ever since. Mr. J. R. Bruce, from the first issue, has shown a deep personal interest in the journal and frequently attends the meetings of the Editing and Publishing Committee, offering many valuable suggestions, and has in other ways been of inestimable value to the committee. The make-up and typographical work has been a delight to those who have learned to appreciate the fine touches of the printer's art. The artistic appearance of the journal bears testimony to the talent of Miss Olive Seibert, who for a number of years has been in charge of the make-up. In 1919 Dr. Richards resigned as editor and Dr. Carl B. Drake was appointed in his stead, and that he still retains the chair is ample evidence of his ability and perspicuity.

To Dr. John M. Armstrong who served as secretary of the Editing and Publishing Committee for several years and for his valuable contributions to the History of Medicine in Minnesota the Association is profoundly grateful, and to all those who have served and given of their time and talents to so worthy a cause the Association is indebted to a greater degree than they can possibly appreciate.

With the passing of the years we feel assured that MINNESOTA MEDICINE will go on to greater fields of usefulness to the State Association and to the profession at large. To the present staff we extend our congratulations and hopes for the future.

J. T. CHRISTISON.

GREETINGS FROM THE MEDICAL SCHOOL

THE Medical School of the University of Minnesota is pleased to extend most cordial greetings to MINNESOTA MEDICINE on its twenty-fifth birthday. This has been a most significant quarter century in the development of medical education in Minnesota.

From the date of its official opening in 1888, the Medical School of our State University has

EDITORIAL

enjoyed and profited by the interest and loyal support of the physicians of the state. There were, at times, natural differences of opinion, particularly in the days of the reorganization and expansion of the school, but never was there any fundamental question about the determination of the physicians of this state to have a Medical School of which they could justifiably be proud.

During the past quarter century the Medical School has been able to expand its laboratory and clinical facilities and to enlarge and strengthen its teaching and research staffs. Special gifts have provided clinical, teaching and research units such as the George Chase Christian Memorial Cancer Institute; the Todd Eye, Ear, Nose and Throat Hospital; the Eustis Hospital for Crippled Children; the Psychiatric Clinic for Children, and the Department of Postgraduate Medical Instruction. This latter, which has been conducted in coöperation with the University's Center for Continuation Study, has been a unique and most successful service to the physicians of this state.

Prominent among the responsibilities of a modern Medical School is the conduct of scientific research. To support such research at the University of Minnesota, the State Medical Association joined with the Regents of the University in a request to the legislature for a special appropriation for medical research. This appropriation, which was first voted in 1919 and has been continued annually, has been invaluable in supporting medical research, some of which has resulted in important progress in medical practice and has brought credit to the University and to the state of Minnesota.

In promoting the relationship of the Medical School to the profession of the state, MINNESOTA MEDICINE has rendered effective and valuable service. At the present time, the Medical School is concentrating its efforts primarily on war research and on the training of medical students for service with the armed forces in a minimum possible time. During these critical times it is especially important that the Medical School and the profession of the state coöperate most intimately in keeping medicine in Minnesota upon a sound and progressive course. In the attainment of this objective MINNESOTA MEDICINE will continue to play an exceedingly important role.

HAROLD S. DIEHL.

JANUARY, 1943

TWENTY-FIVE YEARS HAVE PASSED

TWENTY-FIVE years have passed since the first number of MINNESOTA MEDICINE appeared in January, 1918. It seems advisable, therefore, to commemorate the occasion by the publication of a special number of the journal devoted to a review of the scientific progress made in medicine during this period. All of the articles in this number were submitted at our request and most of them record the development of the various specialties during this period. A complete portrayal of progress is impossible. The attempt to cover most of the specialties was not entirely successful. We trust that the summary, though incomplete, will prove interesting to our readers.

MINNESOTA MEDICINE had its beginning during the last year of World War I. A number of its editorials during its first year consisted of pleas for more enlistments in the Medical Reserve Corps. By June, 1918—fourteen months after our entrance into the war—there were only 15,000 medical men in the service compared to some 40,000 now in the service. Some of the editorials which have appeared the past year resemble those of twenty-five years ago on the same subject of enlistment. Many of the authors who appeared in the first volume are still contributors—evidence that twenty-five years is not such a long period of time after all.

Any success that the journal may have attained is due to the coöperation of the profession of the state. The character of the scientific papers which have appeared in MINNESOTA MEDICINE affords some idea of the progress made in medical science during the past twenty-five years. Members have been most coöperative in furnishing editorials when asked. Many members have assisted in the editing of the journal from time to time, in obtaining reviews of articles in the former Progress Section, in writing book reviews and as committee chairmen in furnishing sections such as those of Medical Economics and Industrial Health. No attempt will be made to name them, but they have all made valuable contributions.

The purposes of the journal as outlined in its first editorial were those of the State Medical Association:

To federate and bring into one compact organization the entire medical profession of the State of Minnesota;

EDITORIAL

To extend medical knowledge and advance medical science;

To elevate the standard of medical education;

To secure the enactment and enforcement of just medical laws;

To promote friendly intercourse among physicians;

To enlighten and direct public opinion in regard to the great problems of state medicine. . . .

The policy of the journal as asserted in its first number was to remain independent, not to be the mouthpiece of any individual or any group and to work only for the best interests of the profession and the public. Advertising was to comply strictly with rules laid down by the Council on Pharmacy and Chemistry of the American Medical Association.

This has been, and continues to be, the aim of the journal. The goal may not have been fully reached but we shall press on with the same purposes in mind.

IMPROVEMENT IN MORTALITY STATISTICS

THAT progress has been made during the past twenty-five years in medicine and in public health is shown by mortality statistics. The experience of the Metropolitan Life Insurance Company,* which closely parallels the vital statistics of the country at large, shows some interesting data.

Deaths from tuberculosis are today about one-fifth of those twenty-five years ago. Measles, scarlet fever, whooping cough, diphtheria, the diarrheas and enteritis have been virtually eliminated as causes of death today. Interesting in this connection are the vital statistics for 1939 in regard to whooping cough, measles and diphtheria. In that year there were 3,026 deaths in the country attributed to whooping cough, 1,174 to measles and 1,993 to diphtheria. While not nearly as serious causes of death in comparison with twenty-five years ago, the statement that these three diseases have been virtually eliminated as causes of death should be somewhat modified.

The mortality of syphilis is today about half of that twenty-five years ago. That from pneumonia has been at least halved. Maternal deaths today are also about half the figure of twenty-five years ago.

The reduction in fatalities due to industry has been outstanding during this period. By con-

trast the fatalities due to automobile accidents have greatly increased. This perhaps is not surprising when we consider that in 1917 there were only five million automobiles on the roads compared with thirty-three million before gas and tire rationing came into effect. Rationing and a thirty-five-mile speed limit should have a favorable effect on this figure.

THE INCIDENCE OF SYPHILIS

A FEW years ago when venereal disease was brought more into the open and an active campaign to attack the problem was instituted, some assertions were made as to the incidence of venereal disease which at the time were questionable. If our memory serves us correctly we were led to believe that about every tenth individual had, had had, or would have syphilis. To those clinicians in the Twin Cities who were on the lookout for cases of primary syphilis for use as clinical material, this statement certainly did not seem true for Minnesota.

It is, therefore, most interesting to have presented an analysis of the incidence of syphilis as discovered amongst some 1,895,778 selectees and volunteers examined up to August 31, 1941.* The reports on this number are sufficiently complete to warrant analysis and have come from every state in the union except Idaho, Kentucky, Oregon and Vermont.

In brief, 45.3 per 1000 of selectees between the ages of twenty-one and thirty-five in the entire country showed positive or doubtful blood reactions.

Broken down, the figures show an incidence of 17.4 per 1,000 in the white selectees in this age group and 252.3 in the colored.

It is interesting to note how Minnesota stands in relation to the other states. We rank forty-first out of forty-five states listed and have an incidence of 8.6 per 1000 whites in this age group. We also stand thirty-fifth in the thirty-seven states tabulated for negro selectees.

Among white young men in Minnesota between the ages of twenty-one and thirty-five less than 1 per cent have positive blood reactions. While the incidence, according to this article, tends to increase slightly in the older age groups, the incidence in the male white population is probably less than 1 per cent.

*Bulletin of the Metropolitan Life Insurance Company, 23:1, (Mar.) 1942.

Vonderlehr, R. A., and Usilton, Lida J.: Syphilis among men of draft age in the United States. Jour. A.M.A., 120: 1369, (Dec. 26) 1942.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association
George Earl, M.D., Chairman

"DOCTOR-SHORTAGE"

The phrase "doctor-shortage" is on every editor's mind these days. It has become one of those accepted feature subjects which every publication feels it must cover for its readers. Generally the author is a lay "viewer-with-alarm" or a staff feature writer and seldom, if ever, one of the medical men who have personally struggled with the problem of procuring physicians for the armed forces.

To the latter was given the job of finding and classifying the men who could be spared from their communities for the expanding army. Their job was tremendous; but the anniversary of Pearl Harbor found most of the states with quotas met or exceeded and an orderly procedure established.

That there would be some hardship was a mathematical certainty. That the medical situation in some industrial areas might become acute in spite of every recourse open to Procurement and Assignment was also clearly foreseen.

Procurement's War Job

The point was that there is a war and Procurement and Assignment had a war job to do. The fighting forces had to have doctors and PAS found the doctors. They were also mindful of the need at home and saw to it, in so far as they were able, under the law, that no community was completely stripped of medical service. The need was urgent, the work had to be done quickly; but the problem of medical distribution at home was neither ignored nor overlooked.

Now it has become apparent, even to the casual observer, that the boom towns have medical as well as housing, sanitation and police problems. It is a curious fact, however, that lack of housing and sanitary facilities is accepted with philosophical resignation by Congress and the

press. Everybody recognizes that war and not the architects or the lumber dealers or the plumbers are to blame for it. There seems to be little justice or understanding, therefore, in the general disposition to blame the doctors for the inevitable reduction in the number available for medical services in these areas.

Juggling the Bureaus

The critics who demand new agencies and new laws forget that no matter how they juggle the bureaus they will still be dealing with a limited number of men and men who have the same right of preference about where they will work as the welders and riveters. The proposal to lower license standards for the duration of the war might indeed be the answer in exceptional instances; but the general assumption that a poorly trained physician is better than none at all is open to argument even in wartime and the difficulty of revoking special wartime licenses when the war is over must be considered.

The logical answer to the problem has already been made in many isolated communities throughout the country and is being encouraged and implemented on the basis of careful studies by Procurement and Assignment. That is an effective reorganization of the time and services of the doctors who remain at home.

Portland's Answer

That is what physicians of Portland, Oregon, have done, for example, in dealing with the medical problems of the Kaiser plants which in themselves created a monster boom town problem on the Pacific coast. If it could be done there without forced relocation of physicians and sacrifice of licensing standards, it can be done elsewhere. State Committees of Procurement and Assignment are now not merely combing their lists for men who can be spared to fill Army quotas

for 1943 but are carefully studying the civilian situation in their states with a view to just such local readjustments and reorganizations.

Rotation for Rural Communities

In Minnesota the largest concentrations of industrial workers are near the Twin Cities and they are served by the largest concentrations of physicians and hospitals in the state. Consequently there are no typical boom town problems in Minnesota. The greatest difficulty will come in rural areas, now largely drained of all but the minimum number essential for their districts. Those who remain will undoubtedly be operating in the future on a co-operative, rotating basis by which responsibilities for serving some areas will be assumed jointly by all neighboring physicians. Such co-operation has worked admirably where it has been tried and will meet the need more satisfactorily than any hasty licensing of doubtfully trained men.

RHODE ISLAND'S SICK BENEFIT PLAN— FIRST IN U. S.

The first sickness compensation plan to be attempted in any state in the United States goes into effect in Rhode Island this month.

According to an article by John E. Farrell, executive secretary of the Rhode Island Medical Association, which appeared in a recent issue of the *Rhode Island Medical Journal*, the actual background of the act was not employee demand but the fact that a reserve fund of approximately twenty-eight million dollars has been amassed by the state as a result of unemployment compensation taxes. The Unemployment Compensation Board proposed sickness compensation to forestall any demand on the part of employees to eliminate or reduce their tax.

Rhode Island is one of only five states in the country in which employees contribute to unemployment compensation insurance. The three per cent taken from employee wages for this purpose in a highly industrialized state has run into a tidy sum, sufficient to start the sickness compensation plan on a financially sound basis. Moreover, employees are already being taxed one and one-half per cent in addition to pay for the new plan, the entire sickness tax being deducted from employee contributions.

Sizable Reserve

Actually payroll deductions have been made since last June and a sizable fund is in process of accumulation from which benefits will be paid after April 1, 1943.

Labor leaders are reported to have endorsed the plan and it has the blessing and actual support of the Federal Social Security Board. Physicians, upon whom rests the burden of certifying claimants for benefits, were not consulted and they face many vexing problems.

The definition of sickness is very broad in the act. It carries a possibility of certification by other licensed healers besides doctors of medicine and of many questionable claims. The doctor will be placed between the authorities on the one hand, the patient on the other and thus runs the risk of endangering his reputation for integrity or of losing patients.

The solution for this problem suggested by Mr. Farrell is the employment of a qualified medical man by the disbursing agency to certify all claims. This solution is in line with recommendations by the House of Delegates of the American Medical Association.

Federal Government Interested

Most interesting of Mr. Farrell's observations is the close intimate connection which even now exists, he notes, between the Federal Security Agency and the Rhode Island plan. It is provided in the act that any funds which may be made available under title III of the Social Security Act shall be used for administration of the plan. The plan also calls for utilization of present public employment offices throughout the state as administrative offices for the cash sickness compensation fund and such offices are now supported in part by federal funds.

For Local Control

Says Mr. Farrell in conclusion: "Whatever the outcome of the present experiment, it is evident that Rhode Island has a tremendous responsibility to prove that its sickness insurance plan can be carried forward successfully under local control and with local finances."

Rhode Island and other states with sound financial reserves may find it possible to administer sickness insurance successfully. Success will invite imitation elsewhere and it is apparent that federal authorities anticipate eventual participation in administrative control.

INSURING AGAINST THE "THIRD HAZARD"

Most discussions about health insurance are carried on either by professed advocates of government participation or by representatives of the medical profession who, in spite of every wish to be impartial, may be regarded as fundamentally opposed, in general, to plans for socialization of medicine.

It is, therefore, of real interest to have an analysis of the outlook for health insurance in America by a neutral like Mr. Reinhard A. Hohaus of New York who can talk about it without prejudice in relation to the general plan for social security in America.

Mr. Hohaus is an actuary for the Metropolitan Life Insurance Company. He finds that Social Security provisions for old age and for dependent survivors have made a good start along sound lines. On the other hand, basic changes in principle and underlying philosophy are essential to the present plan for unemployment insurance and these should come about before the postwar depression arrives, though the outlook for such developments is not encouraging.

Going Will Be Difficult

Health insurance, he catalogues as the third possible category if the government is to protect against the major hazards of life. But, here, the going will be difficult; the country is unexplored and he earnestly advises against any blind following of precedents for government old age, survivorship and unemployment insurance plans or of government plans adopted abroad.

The situation is confused, the questions to be answered many and even the meaning of the term "health insurance" yet to be determined. Furthermore, health insurance does not, like old-age insurance, permit provision of a basic amount of service on a minimum "social adequacy" level which the citizen may supplement with his own protection. It is highly inadvisable to foster the existence of overlapping systems of care with several doctors replacing one responsible advisor for the individual beneficiary. Also compensation for time lost by reason of illness is regarded by many as of equal importance to insurance for medical services; but the one does not dovetail successfully with the other.

Preventive Medicine Susceptible

The preventive aspect of medicine seems to Mr. Hohaus to be much more susceptible of governmental action than personal medical service. In its more elementary phases including sanitation and epidemic control it is now part of the normal activities of public health authorities. He sees no insuperable obstacle to including more positive functions of maintaining health and well-being at a high level of efficiency, including in these functions, nutrition education and recreation and physical training, no less than immunization and a yearly check-up. "Here, if anywhere," he says, "government does not need to be too meticulous about drawing a line between what is merely adequate and what may be described as additional or supplementary. Positive health promotion of a public or community nature is one field in which an intelligent and non-overlapping mutually beneficial rivalry between government and private enterprise is entirely practicable and of inestimable advantage to all."

Harassed Patient

"New problems arise," he remarks, "if government decides to extend social insurance to the field of health benefits and we are to retain our democratic principle of giving individuals the opportunity of buying additional protection from private sources through their private means. These problems would indicate that, in many cases at least, the function of private health insurance and private medical care should be in the nature of an alternative method of providing the entire coverage which individuals or groups may elect under prescribed conditions, rather than just additional coverage to supplement the basic minimum protection otherwise offered by social insurance. Supplementary medical care, carrying on where the compulsory minimum provisions leave off, would surely often complicate matters and unnecessarily harass the patient by subjecting him to a switch from one system to the other, perhaps at the very time he most needs continuity of treatment. What the effect would be on the quality and effectiveness of the medical treatment is a question for a physician to answer, but I suspect the answer would be far from favorable. When a physician knows that his primary responsibility for a certain case is limited in time or extent or shared contemporaneously with some other physician or physicians, should

we expect his sense of responsibility, of independence and of initiative in the case, or his personal relationship to the patient to be keyed to as high a pitch as it otherwise might?"

Innovations Ahead

On the other hand, Mr. Hohaus, in common with other observers, sees ahead indications of major innovations in medical services.

"The questions posed," he says, "are not simply the pros and cons of extending our present social insurance system to health insurance. A number of signs indicate that, irrespective of what the decision is regarding such an extension, the next few years will see a number of major developments and innovations in the provision of medical care. We are told that about one-third of American doctors and dentists will be in the armed forces by the end of this year. Similar reductions in the civilian supply of nurses and other personnel auxiliary to the medical profession must be expected. . . . Can we safely assume that all temporary measures which may be required because of such shortages will disappear when the war ends? May we not anticipate that experience will show that at least some should be retained permanently?"

"Then, too, there will be the exposure of a very large part of the medical profession—especially physicians who have gone from internship to the armed forces—to methods of medical care quite dissimilar in economic and other aspects from the conventional methods of private practice in peacetime. What will their attitude be after peace is won and they and others in military and naval service return to civilian life?"

Modifications Will Be Required

If the broad concept that a minimum of social protection against the hazards of life should be governmentally provided is extended to include medical services, Mr. Hohaus is certain that modifications will be required because of the intimate and personal nature of the services. Here, he says, the role of the Federal government must be one of greater aloofness, confined to assuring that adequate care will be provided, rather than directly participating in the actual provision. Such direct participation would be appropriate only when no suitable agency appears to be available and where choice would seem to lie between a bare minimum governmentally provided and outright charity, or nothing at all.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

Physicians Licensed November 13, 1942

October Examination

Armstrong, Wallace David, U. of Minn., M.B. 1937; M.D. 1937, 310 Cecil St. S.E., Minneapolis, Minn.
 Arzt, Philip Klaus, Creighton U., M.D. 1937, 2057 Port-land Ave., Saint Paul, Minn.
 Babb, John William, U. of Western Ont., M.D. 1941, Mayo Clinic, Rochester, Minn.
 Baker, Jeannette L., Indiana U., M.D. 1929, Fergus Falls, Minn.
 Banner, Edward Arthur, Loyola U., M.D. 1940, Mayo Clinic, Rochester, Minn.
 Bechtel, Martin John, U. of Minn., M.B. 1942, Minne-apolis General Hospital, Minneapolis, Minn.
 Bernstein, Irving C., U. of Minn., M.B., 1942, Ancker Hospital, Saint Paul, Minn.
 Black, Albert Seward, Jr., Rush Med. Coll., M.D. 1940, Mayo Clinic, Rochester, Minn.
 Blackmore, Sidney Charles, U. of Minn., M.B. 1941; M.D. 1942, Minneapolis General Hospital, Minneapolis, Minn.
 Carmona, Manuel Gumersindo, Jefferson Med. Coll., M.D. 1941, Mayo Clinic, Rochester, Minn.
 Connolly, Coleman Joseph, U. of Minn., M.B. 1942, Ancker Hospital, Saint Paul, Minn.
 Copsey, Harvey Gayle, U. of Neb., M.D. 1941, Mayo Clinic, Rochester, Minn.
 Dahleen, Henry Cross, Stanford U., M.D. 1940, Mayo Clinic, Rochester, Minn.
 De Vall, Lois Valborg, Rush Med. Coll., M.D. 1941, St. Mary's Hospital, Minneapolis, Minn.
 Dougherty, Charles Joseph, Jefferson Med. Coll., M.D. 1938, Mayo Clinic, Rochester, Minn.
 Faber, William Max, U. of Wis., M.D. 1938, Mayo Clinic, Rochester, Minn.
 Frear, Rosemary R., U. of Minn., M.B. 1934; M.D. 1942, St. Mary's Hospital, Minneapolis, Minn.
 Golden, Peter Bernard, U. of Wis., M.D. 1940, Mayo Clinic, Rochester, Minn.
 Grant, John Carton, U. of Minn., M.B. 1942, Ancker Hospital, Saint Paul, Minn.
 Hawkins, Willian John, Rush Med. Coll., M.D. 1939, Mayo Clinic, Rochester, Minn.
 Heinrich, Weston Ackland, Northwestern, M.B. 1941; M.D. 1942, Mayo Clinic, Rochester, Minn.
 Heise, Paul von Rohr, Marquette U., M.D. 1941, Minneapolis General Hospital, Minneapolis, Minn.
 Heller, Ben Irwin, U. of Minn., M.B. 1941; M.D. 1942, 745 Belgrave Ave. N., Mankato, Minn.
 Humphrey, Irving Leslie, Harvard U., M.D. 1940, Mayo Clinic, Rochester, Minn.
 Janecky, Allen Gustav, U. of Minn., M.B. 1942, Asbury Hospital, Minneapolis, Minn.
 Kirkwood, Roger Tom, Northwestern, M.B. 1942, Minneapolis General Hospital, Minneapolis, Minn.
 Kratzer, Guy Livingston, Temple U., M.D. 1935, Mayo Clinic, Rochester, Minn.
 Kuhlmann, Lawrence Bernard, U. of Neb., M.D. 1942, St. Joseph's Hospital, Saint Paul, Minn.
 Leemhuis, Andrew Joseph, U. of Minn., M.B. 1942, Minneapolis General Hospital, Minneapolis, Minn.
 Lemon, Willis Edward, U. of Minn., M.B. 1942, Mercy Hospital, Pittsburgh, Pa.

IN MEMORIAM

Long, Gabe Celsor, U. of Ill., M.D. 1938, Mayo Clinic, Rochester, Minn.
Lucking, Bernard Anthony, U. of Minn., M.B. 1941, Minneapolis General Hospital, Minneapolis, Minn.
Metcalfe, Robert Matthew, U. of Colo., M.D. 1940, Mayo Clinic, Rochester, Minn.
Miller, Richard Cramer, Harvard U., M.D. 1941, Mayo Clinic, Rochester, Minn.
Murphy, Michael E., U. of Minn., M.B. 1941; M.D. 1941, Mayo Clinic, Rochester, Minn.
Mussey, Mary Elizabeth, U. of Minn., M.B. 1940; M.D. 1941, Mayo Clinic, Rochester, Minn.
Payne, John Hilliard, U. of Cincinnati, M.B. 1940; M.D. 1941, Mayo Clinic, Rochester, Minn.
Reid, Lewis Miller, U. of Minn., M.B. 1941, Minneapolis General Hospital, Minneapolis, Minn.
Reinecke, Roger M., U. of Minn., M.B. 1940; M.D. 1941, Mayo Clinic, Rochester, Minn.
Ritt, Arnold Elmer Frederick, U. of Ill., M.D. 1932, Minneapolis General Hospital, Minneapolis, Minn.
Roach, Francis Xavier, Jr., U. of Minn., M.B. 1942, Ancker Hospital, Saint Paul, Minn.
Rowe, Clarence John, Jr., U. of Minn., M.B. 1942, St. Joseph's Hospital, Saint Paul, Minn.
Sauer, William George, U. of Cincinnati, M.B. 1939; M.D. 1940, Mayo Clinic, Rochester, Minn.
Scholten, Roger Adrian, Jefferson Med. Coll., M.D. 1937, Mayo Clinic, Rochester, Minn.
Sidell, Richard Huntington, Rush Med. Coll., M.D. 1940, Mayo Clinic, Rochester, Minn.
Simmonds, Frank Lawrence, U. of Minn., M.B. 1941, Minneapolis General Hospital, Minneapolis, Minn.
Spencer, George Norton, Marquette U., M.D. 1942, St. Barnabas Hospital, Minneapolis, Minn.
Stahr, Aubrey Cecil, U. of Minn., M.B. 1938; M.D. 1939; 4528 Fremont Ave. S., Minneapolis, Minn.
Stotler, John Francis, Rush Med. Coll., M.D. 1940, Mayo Clinic, Rochester, Minn.
Turner, Thomas Richard, Baylor U., M.D. 1941, Mayo Clinic, Rochester, Minn.

By Reciprocity

Anderson, Leo Eugene, U. of Neb., M.D. 1941, Mayo Clinic, Rochester, Minn.
Blumgren, John Edgar, U. of Iowa, M.D. 1941, St. Mary's Hospital, Duluth, Minn.
Davis, Edward Valentine, U. of Neb., M.D. 1933, Kirksville, Mo.
Swickard, George Yeagley, Ohio State U., M.D. 1931, Gopher Ordnance Works, Rosemount, Minn.
Watson, Thomas Leonard, Jr., U. of Virginia, M.D. 1930, Gopher Ordnance Works, Rosemount, Minn.

National Board Credentials

Alway, Sophia Chamberlin, Yale U., M.D. 1941, 803 University Ave. S.E., Minneapolis, Minn.
Balfour, William Mayo, U. of Minn., M.B. 1939; M.D. 1940, Mayo Clinic, Rochester, Minn.
Blumenthal, Lester Sylvan, Geo. Wash. U., M.D. 1941, Mayo Clinic, Rochester, Minn.
Manning, John Joseph, U. of Pa., M.D. 1941, Mayo Clinic, Rochester, Minn.
Meyers, Ward Carl, Northwestern, M.B. 1940; M.D. 1941, Mayo Clinic, Rochester, Minn.
Sweeney, Alvin Randolph, Jr., Harvard, M.D. 1939, Mayo Clinic, Rochester, Minn.
White, John Donald, U. of Buffalo, M.D. 1940, Mayo Clinic, Rochester, Minn.

In Memoriam

WILLIAM ANDREW LEE

Dr. William A. Lee, a practitioner at Fergus Falls since 1919, died November 22, 1942, at the age of sixty-three.

Born at Casey, Illinois, October 3, 1879, Dr. Lee attended Central Normal College at Danville, Indiana, where he received a B.S. degree in 1902. He received his medical education at Northwestern Medical School, Chicago, receiving his medical degree in 1911. The following year he served as intern at Mercy Hospital in Davenport, Iowa.

Dr. Lee practiced at Underwood, Minnesota, from 1912 until he entered the army in 1917. After serving eighteen months, part of that time overseas, he joined the medical group with Drs. Baker and Burnap in Fergus Falls. In 1921 he opened an office for himself which he maintained until July, 1942. Because of failing health he then returned to the Fergus Falls Clinic.

He served as city health physician for a great many years and as Otter Tail County coroner for several terms. He was a member of the Elks and Masonic Lodges, a trustee of the Methodist Church, a past Commander of the American Legion and a member of the executive committee of the Boy Scouts for many years. He always took a deep interest in young people and was at one time a teacher and worker in the Methodist Sunday School.

In 1922 Dr. Lee married Lucy Logan Moses of Fergus Falls, who with a son Gordon and daughter Marcella, survives him.

Perhaps Dr. Lee's outstanding characteristic was his cheerfulness which never deserted him even in financial or physical distress. He was also modest but capable in his chosen calling. It is not surprising he had as a result a host of friends. His life is typified by the following tribute to—

The Family Doctor

He walked with modest mien and kindly eye
Along the street, and few would ever guess
That mid the hurrying throngs that surged and pressed
A master soul had passed them gently by.
His smile was such that little children hied
To bask them in its genial wholesomeness;
And when he spake, his words of cheeriness
Shed welcome sunshine like a spring noon sky.
A simple man, yet none in all the land
More great. For he was ever found apart
Where beds of human suffering grimly stand;
And there with soul alert, he lived his art—
The tender gift of healing in his hand,
And God's sweet law of service in his heart.

INDUSTRIAL HEALTH

Edited by the Committee on Industrial Health and Occupational Diseases

A. E. Wilcox, Minneapolis, Chairman

H. B. Allen, Austin
L. S. Arling, Minneapolis
Martin Aune, Minneapolis
Richard Bardon, Duluth

P. H. Bennion, Saint Paul
R. B. Bray, Biwabik
R. P. Caron, Minneapolis
T. H. Dickson, Saint Paul

T. A. Lowe, South Saint Paul
J. L. McLeod, Grand Rapids
C. M. Smith, Duluth
H. G. Wood, Rochester

FOR WORKER HEALTH AND MORALE

Four hundred health directors of leading industrial concerns met recently in Pittsburgh under auspices of the Industrial Hygiene Foundation and seriously discussed a variety of plans for improving the health of their employes.

No longer may employers think only in terms of workmen's compensation. They must also consider good nutrition, morale and adequate medical services, according to these pioneers in better worker health.

Lost time for injuries and illnesses of a non-industrial origin costs the war effort 2,500,000 man-days per week according to the Foundation's council, T. C. Waters of Baltimore. To be successful in the future, Mr. Waters informed the meeting, business enterprise must and will assume more legal responsibility for the health, not only of the workers, but of their families.

Absenteeism Serious

A statistical survey of fourteen industries in 1941 showed 83.1 cases of absenteeism per 1,000 male workers for eight days or longer; 104.6 cases per 1,000 female workers.

One of the remedies discussed at length by these employers and their health directors was to see that the employe is put on the job to which he is best adapted. "Getting fed up" has considerable to do with absenteeism and ineffectiveness. A management policy which shows its appreciation of the workers' efforts and which provides good physical working conditions was regarded as highly important to worker morale and health.

Food and Production

Periodic physical examinations, diet education and correction (especially among women employes from eighteen to twenty-four) are new to many executives but were regarded by these men as fundamental to an adequate plant health program. The exact relationship of diet to fatigue has not yet been satisfactorily solved; but practical experience in many plants has shown the great value of between-meal refreshments of

something other than candy and soft drinks. Milk, soups, sandwiches, fruit have all been used with good effect.

At the meeting, War Manpower Chief Paul V. McNutt predicted that by the end of the year the nation's total labor force will be 59,000,000 of whom 18,000,000 will be in war-production jobs—more than twice as many as a year ago. If the war continues the war-production force will expand to 30,000,000 by the end of 1943.

Services Must Be Pooled

Safeguarding this great army of workers will require all of the ingenuity and co-operative effort of doctors and employers. Physicians whose practices have been limited, heretofore, to industry will need the aid of every other practitioner in industrial communities to cut down absences from illness and protect the workers' families. Pooling of medical services, hospital facilities and nurses will be necessary where war requirements have expanded populations and normal facilities will otherwise break down.

It is obvious that interest in worker health is no longer confined to physicians and health authorities. Employers and business organizations are rapidly awakening to its significance in terms of production and physicians must be ready to respond to that interest.

Employers Adjust Sights

It is also significant that publications devoted to the business and production outlook are now giving space to meetings such as the one held in Pittsburgh. According to *Business Week*, commenting on the matter, employers need to revise their points of view. The editors prophesy that many will be adjusting their sights soon to health insurance plans, with the cost shared by the worker. The fact is that industrial medical services on the insurance plan are not new in the United States, and may be feasible in a few industrial communities. Workers and their families in most cases, however, must depend upon private medical services.

♦ Twenty-five Years Ago ♦

January, 1918

Governor J. A. A. Burnquist has made the following appointments on the State Board of Health to take effect January 17, 1918: Dr. George D. Head, Minneapolis; Dr. Neill M. Watson, Red Lake Falls; Dr. R. C. Hunt, Fairmont.

Governor J. A. A. Burnquist has appointed Dr. C. W. More of Eveleth on the Advisory Commission of the State Sanatorium for Consumptives (*sic*). Dr. H. Longstreet Taylor, whose term expired, has served on the Advisory Commission as its president since the Commission was created by the Legislature in 1903. Dr. Taylor has always been an enthusiast in anti-tuberculosis work. He has been instrumental in establishing fifteen public, one charitable and one private institution and has seen almost 1500 beds dedicated to the consumptive (*sic*) population of Minnesota during his term of office.

February, 1918

Dr. W. A. Coventry of Duluth read a paper on "Toxemias of Pregnancy" at the midwinter meeting of the Upper Mississippi Medical Society held at Brainerd, January 8. Dr. Thomas McDavitt, secretary of the State Association, also spoke on the defense work of the State Association.

Dr. S. S. Shannon, formerly of Barnum, has located at Crosby. He is associated with Drs. B. A. Smith, E. J. Pengelly, and George Gilbert in the Miners Hospital.

At the December, 1917, meeting of the Red River Valley Medical Society, the following officers were elected: President, Dr. H. W. Froehlich, Thief River Falls; vice president, Dr. F. M. Dryden, Crookston; secretary-treasurer, Dr. Ralph L. Kirsch, Crookston.

March, 1918

Captain Ralph St. J. Perry has been placed in charge of the examination of applicants for commissions in the Medical Reserve Corps from the Northwest.

The tuberculosis sanitarium erected just south of Thief River Falls by the counties of Pennington, Marshall, and Roseau, was formally opened to the public on December 31, 1917. The principal address was delivered by Hon. George F. Mathson of Roseau County. Dr. Robinson Bosworth, executive officer of the Sanitarium Commission of the State Board of Control, was present and spoke briefly. The speaker and commissioner referred often to Dr. G. S. Wattam of Warren, to whose work in behalf of tuberculous patients the people of the state owe a great deal.

April, 1918

Naval Station Hospital, Unit No. 10, has been formed in Minneapolis with the following personnel: Clifford E. Henry, grade of surgeon, rank of Lieutenant Commander; Clinton C. Tyrrell, grade of surgeon, rank of Lieutenant Commander; John T. Litchfield, grade of

passed assistant surgeon, rank of Lieutenant; J. Arthur Riegel, grade assistant surgeon, rank of Lieutenant (*j.g.*); William P. Robertson, grade of assistant surgeon, rank of Lieutenant (*j.g.*).

Dr. J. M. Conroy, late of the City and County Hospital, Saint Paul, has been appointed medical superintendent of Nopeming Sanatorium, near Duluth, Minnesota, to serve during the absence in France of Dr. A. T. Laird.

The following members of the St. Louis County Medical Society have been appointed as the Committee on Arrangements for the next meeting of the Minnesota State Medical Association to be held in Duluth, August 28, 29 and 30: Dr. C. F. McComb, chairman; Dr. W. H. Magie, Dr. W. R. Bagley, Dr. A. H. Schwartz, Dr. C. L. Haney.

May, 1918

Lieut. John S. Abbott, M.R.C., attached to the 18th F.A.B.E.F., is reported in the casualty list of April 15, as missing in action. Dr. Abbott, a practicing surgeon of Saint Paul, received his commission early in June, 1917, and immediately left for France, assigned to the British forces. (Later it was reported that he was a prisoner in Germany.)

The success of Clinical Week under the management of the Hennepin County Medical Society, has been such as to insure that it will be made an annual affair in Minneapolis. Almost 400 physicians from outside the city attended.

Major C. H. Mayo returned April 12 after three weeks' absence in Washington, Fort Oglethorpe and New York.

Major W. J. Mayo departed April 13 for Washington to be absent about three weeks.

June, 1918

Dr. E. W. Buckley, Medical Director of the Knights of Columbus, will leave for France, June 1, to supervise the opening of K. C. huts in the American Army camps in France, England, Ireland and Italy.

Dr. Paul J. Preston writes from Italy thanking the management of MINNESOTA MEDICINE for sending the journal to him.

Major L. B. Wilson, Director of the Division of Pathology, Mayo Clinic, and Director of the Field Army Medical Museum, is in France.

The librarians of the Hennepin and Ramsey County Medical Societies will meet in the near future to arrange the distribution of the exchanges of MINNESOTA MEDICINE in accordance with action taken by the Publication Committee.

The following physicians from Minnesota attended the meeting of the medical section of the National Council for Defense at Washington, D. C., May 4 and 5: Dr. W. H. Magie, Duluth; Dr. W. L. Palmer, Al-

TWENTY-FIVE YEARS AGO

bert Lea; Dr. H. M. Workman, Tracy; Dr. J. W. Little, Minneapolis; Dr. Thomas McDavitt, Saint Paul; Dr. H. P. Ritchie, Saint Paul, and Dr. H. L. Taylor, Saint Paul.

July, 1918

Lieut. Theodore H. Sweetser of Minneapolis has been recommended for the British War Cross for bravery and devotion to duty near Passchendaele on March 13. Though suffering from poison gas, he helped rescue men from a destroyed dugout.

Dean Wulling and his co-workers in the College of Pharmacy, University of Minnesota, during the past year prepared 28,000 half pint bottles of tincture of digitalis. This constitutes the complete supply of the drug used in the United States Army. A large part of the drug was raised in the medical garden of the college.

Word has been received from Major J. S. White of Saint Paul of his safe arrival overseas. (He was later promoted to rank of Lieutenant-Colonel.)

August, 1918

Dr. Alexander R. Colvin of Saint Paul has been commissioned a major in the medical reserve corps.

Dr. Ernest T. F. Richards, Saint Paul, has been appointed Acting Chief of the Department of Medicine, University of Minnesota, during the absence of Dr. L. G. Rowntree, who has been commissioned a lieutenant-colonel in the national Army.

Thirteen University of Minnesota Medical School seniors, on their way to France, received their diplomas aboard ship. They are members of Base Hospital, Unit No. 26, and were the first class from the University to get their collegiate degrees on the high seas.

A dispatch from the Associated Press announces under date of July 18 that the government is about to assume control of the entire medical profession in the United States to obtain sufficient doctors for the fast growing Army, and at the same time to distribute those remaining to the localities or services where they are most needed for civilian work.

At its regular meeting, July 9, the State Board of Health created a Division of Child Conservation (later changed to Division of Child Welfare), and appointed Dr. E. J. Huenekens of Minneapolis as director. Two nurses, who are experienced in public health work, have been employed by the Board for field work in this division.

September, 1918

Word comes to us that Lieut. Stanley R. Maxeiner of Minneapolis, who has been with the British Expeditionary Forces for the past year, has devised a

splint for the temporary care of fracture of the humerus, et cetera.

Dr. P. M. Hall of Minneapolis took Dr. George W. Beach's place as superintendent of the State Tuberculosis Sanatorium at Walker, August 1.

October, 1918

At the annual meeting of the Minnesota State Medical Association held at Duluth, August 28, 29 and 30, Major John D. McLean, secretary of the general medical board of the National Council of Defense, was one of the principal speakers . . . His subject was "Medical Reserve Corps and Volunteer Service Corps." . . . Col. Reuben Miller of the Surgeon General's office described conditions that obtain in the Army for medical men.

Lieut. R. C. Lowe of Fairmont, Minnesota, who has been at home on leave, has been appointed a flight surgeon and hereafter will devote his time to caring for Uncle Sam's fliers. He is now stationed at Wilbur Wright Field, Dayton, Ohio.

The present address of Captain Stephen H. Baxter, M.R.C., Minneapolis, is 60th Infantry, A.E.F., France.

November, 1918

Dr. Nellie Barsness, the first woman physician in Saint Paul appointed to overseas war service, left for New York . . . expecting to sail at once for France, where she will serve in the new hospital for the treatment of gassed soldiers established by the American Women's Suffrage Association.

Lieut. Felix John Traxler and Miss Marie Fitzgerald were married at San Antonio, Texas, on August 31. Lieutenant Traxler is a graduate of Creighton University and up to the time of his entering the service practiced at Henderson, Minnesota.

December, 1918

Dr. Henry Wireman Cook, Minneapolis, has been called to Washington to serve for six months as associate director of the Medical Service Bureau of the American Red Cross.

Dr. F. C. Rodda of Minneapolis left a few weeks ago for New York, expecting to leave soon for France where he will take up Red Cross work in children's hospitals behind the battle lines.

Owing to the epidemic of influenza and to the great number of physicians in service the executive committee of the Southern Minnesota Medical Association decided not to hold their annual session as planned on November 25 and 26.

Dr. E. M. Jones, Saint Paul, now stationed at Walter Reed Hospital, Washington, D. C., has recently been promoted to the rank of major.

ZEMMER
Write for Literature
THE ZEMMER COMPANY • OAKLAND STATION • PITTSBURGH, PENNSYLVANIA

**PRESCRIBE OR DISPENSE ZEMMER
PHARMACEUTICALS**
Tablets, Lozenges, Ampoules, Capsules, Ointments,
etc. Guaranteed reliable potency. Our products
are laboratory controlled. Write for catalogue.
Chemists to the Medical Profession MIN-1-43

I like S-M-A!

IN INFANT FEEDING ... IT SAVES MY TIME

- Directions on how to mix and feed S-M-A can be explained to the mother and nurse in two minutes.
- S-M-A is more easily digested by the normal infant because of the all-lactose carbohydrate and the unique S-M-A fat.
- With S-M-A nothing is left to chance. All the vitamin requirements, except ascorbic acid, together with additional iron are included in S-M-A in the proper balance, ready to feed.
- S-M-A fed infants compare favorably with breast-fed infants in growth and development.

Prescribe S-M-A!



*S-M-A, a trade mark of S.M.A. Corporation, for its brand of food especially prepared for infant feeding—derived from tuberculin-tested cow's milk, the fat of which is replaced by animal and vegetable fats, including biologically tested cod liver oil, with the addition of milk sugar and potassium chloride; altogether forming an enteral food. When diluted according to directions, it is essentially similar to human milk in percentages of protein, fat, carbohydrate and ash, in chemical constants of the fat and physical properties.



S. M. A. CORPORATION • 8100 McCORMICK BOULEVARD • CHICAGO, ILLINOIS

♦ Reports and Announcements ♦

MEDICAL BROADCAST FOR JANUARY

The Minnesota State Medical Association broadcasts weekly at 10:15 o'clock every Saturday morning over Station WCCO, Minneapolis and Saint Paul, and at 11:30 o'clock over Station WLB, University of Minnesota. Speaker: William A. O'Brien, M.D., Director of Postgraduate Medical Education, Medical School, University of Minnesota.

January 2—Blood and Blood Substitutes
January 9—Hemorrhage and Shock
January 16—Treatment of Burns
January 23—Blood and Blood Substitutes in Chronic Illness
January 30—Bleeding Gums

CONGRESS ON INDUSTRIAL HEALTH

The fifth annual Congress on Industrial Health, sponsored by the Council on Industrial Health of the A.M.A., will be held on Monday, Tuesday and Wednesday, January 11-13, 1943, at the Palmer House in Chicago. These meetings are open to physicians and others interested in industrial health. Various phases having to do with prevention and treatment of diseases

and conditions associated with industry will be participated in by the Council on Pharmacy and Chemistry and the various sub-committees of the Council on Industrial Health. On the last day Nutrition of Industrial Workers will be the subject of a round-table discussion to be followed by a conference on industrial health under the joint auspices of the Chicago Medical Society and the Illinois Manufacturers Association.

UROLOGY AWARD

The American Urological Association offers an annual award "not to exceed \$500" for an essay (or essays) on the result of some specific clinical or laboratory research in urology. The amount of the prize is based on the merits of the work presented, and if the Committee on Scientific Research deem none of the offerings worthy, no award will be made. Competitors shall be limited to residents in urology in recognized hospitals and to urologists who have been in such specific practice for not more than five years.

The selected essay (or essays) will appear on the program of the forthcoming meeting of the American

(Continued on Page 130)

INTRODUCTORY OFFER

"OVA-ESTRIN"

(Estrogenic Extract)

10,000 International Units per c.c.

Manufactured by
HOSPITAL LIQUIDS CO.

Per 15 c. c. vial, **\$4.25**

1 VIAL FREE WITH THE PURCHASE
OF 2 VIALS.

On this basis your cost is 19c per c.c.*

ENDO LIVER EXTRACT

(Injectable)

For intramuscular use.

Purified Solution of Liver U.S.P.

Each c.c. represents 10 injectable units.

10 c.c. Vial—100 U.S.P. Units

Only **\$2.75**

For a limited time—One 10 c.c. Vial **FREE**
with the purchase of 3 Vials.

Accepted by the
Council on Pharmacy & Chemistry of the A. M. A.

C. F. ANDERSON CO INC.

901 Marquette Avenue

ATlantic 3229

Minneapolis, Minn.

Write for Prices in Quantities

PYOKTANIN SURGICAL GUT

Plain and Formalized

Manufactured Since 1899 by

The Laboratory of the Ramsey County Medical Society

Packaged dry in hermetically sealed glass tubes in accordance with the new requirements of the U. S. Pharmacopoeia.

• • •

Price List

PLAIN TYPE A NONBOILABLE
AND
FORMALIZED TYPE C NONBOILABLE

Sizes.....000 — 00 — 0 — 1 — 2 — 3
28 inches.....per dozen strands \$2.00
60 inches.....per dozen strands \$3.00

*Special discount to hospitals and to the
trade. Cash must accompany the order.*

• • •

Address

LABORATORY RAMSEY COUNTY MEDICAL SOCIETY

Lowry Medical Arts Building, St. Paul, Minnesota

FOR SALE BY SURGICAL DEALERS AND DRUGGISTS

Congratulations— Minnesota Medicine

—for your 25 years of service to the Minnesota Medical Profession.

We're "Old-Timers," too!

For 46 years we have been serving the Medical Profession of the Northwest—in the scientific construction and correct fitting of

ARTIFICIAL LIMBS AND ARMS—BRACES— TRUSSES—SUPPORTERS —ELASTIC HOSIERY



The recognized high standard of BUCHSTEIN Service is the result of exacting conformity to professional specifications, the outstanding skill of BUCHSTEIN workmen and the use of only finest quality materials. This assures greater comfort and service to the patient and greater confidence in the doctor's recommendation.

BUCHSTEIN SERVICE IS
DEPENDABLE

BUCHSTEIN-MEDCALF CO.

610 Third Ave. So. Minneapolis, Minn.

UROLOGY AWARD

(Continued from Page 128)

Urological Association, May 31-June 3, 1943, Hotel Jefferson, St. Louis, Missouri.

Essays must be in the hands of the Secretary, Dr. Thomas D. Moore, 89 Madison Avenue, Memphis, Tennessee, on or before March 1, 1943.

WAR SURGERY MEETING

To fill the need for inspiration and information with regard to the war medical problem, the American Academy of Orthopedic Surgeons and the Clinical Orthopedic Society have combined their annual meeting to meet this challenge. This joint meeting will be held on January 17, 18, 19 and 20, 1943, at the Palmer House in Chicago. The keynote of this occasion will be "War Surgery" and its application to civil practice. Those members of the medical profession in good standing, who are interested in bone and joint surgery and its allied fields, may have the privilege of attending.

There will be four sections of interest connected with this program:

1. A clinical program.
2. A general scientific assembly.
3. An instructional section
 - (a) Group discussion courses.
 - (b) Motion pictures of surgical methods and technique.
4. Scientific exhibits.

The speakers and faculty are drawn from the leading surgical authorities of this country, as well as distinguished guests from England, Canada, South America and the Hawaiian Islands. These will include a sizable group of Army and Navy Surgeons who have had to deal directly with the war casualties from across both oceans.

Thorough, concise, short discussion courses will be offered on the following subjects. Each will have an outstanding faculty, many of whom are in military service.

- I. Surgery of the Hand
- II. Fractures
- III. Peripheral Nerve Injuries
- IV. Amputations
- V. Lame Backs
- VI. Surgery of the Hip
- VII. Surgery of the Knee
- VIII. Burns and War Plastic Procedures
- IX. Foot Disabilities
- X. Differential Diagnosis of Bone Pathology
- XI. Reconstructive Surgery Following Trauma of the Upper Extremity
- XII. Surgical Anatomy

Several special features in connection with the general program include:

- A. An afternoon devoted to "Complicating Trauma Associated with Orthopedic Casualties." This will include a discussion of the following subjects:

REPORTS AND ANNOUNCEMENTS

1. "Shock—Its Early Recognition and Treatment."
2. "Blast, Crush and Compression Injuries."
3. "Thoracic Injuries."
4. "Head and Spine Injuries."
5. "Gunshot Injuries to Abdomen."
6. "Injuries to Genito-Urinary Tract."

B. One evening devoted to the subject of "Chemotherapy in the Treatment of Wounds," with eminent authorities who have studied the subject from various angles.

C. Another evening given to a debate on "The Kenny Treatment for Anterior Poliomyelitis."

There will be no time for play. Morning, afternoon and evening will be devoted entirely to the problems as they have been outlined. As has been stated previously, members of the medical profession who are interested in such a program are welcome to attend, and may receive an invitation by writing to the secretary, Dr. Myron O. Henry, 401 Medical Arts Building, Minneapolis, Minnesota. Hotel and railroad reservations should be made early.

ST. LOUIS COUNTY MEDICAL SOCIETY

Dr. Walter E. Hatch of Duluth was elected president-elect of the St. Louis County Medical Society at its annual meeting held at the Kitchi Gammi Club, Duluth, December 10. Officers who will have Society matters in charge this year are: President, Dr. Carl O. Kohlbry, Duluth; vice president, Dr. Henry E. Binet, Grand Rapids; secretary-treasurer (re-elected), Dr. R. P. Buckley, Duluth. Dr. R. J. Manley, Duluth, was elected delegate to the State Association meeting, with Dr. Robert D. Bray, Biwabik, as alternate.

Committee appointments for the year are as follows: *Advisory*—Dr. P. G. Boman, Duluth.

Judiciary Committee—Dr. Robert D. Bray, Biwabik; Dr. D. L. Tilderquist, Duluth; Dr. E. L. Tuohy, Duluth.

Economics Committee—Dr. L. A. Barney, Duluth; Dr. F. H. Magney, Duluth; Dr. J. A. Malmstrom, Virginia.

RAMSEY COUNTY MEDICAL SOCIETY

At the annual meeting of the Ramsey County Medical Society in December, the following officers were elected to serve for the coming year: President-elect, Dr. John H. Lepak (who will take office in 1944); president, Dr. W. R. McCarthy; vice president, Dr. Justus Ohage; Dr. Joseph M. Ryan, secretary-treasurer.

RENVILLE COUNTY MEDICAL SOCIETY

At the annual meeting of the Renville County Medical Society held December 1 at Olivia, Minnesota, Dr. J. A. Cosgriff of Olivia was elected president for the coming year. Dr. A. M. Fawcett of Renville was elected vice president, and Dr. R. E. Billings of Franklin, secretary.

The meeting followed a dinner served by the Home Economics department of the Olivia high school. Twenty-eight physicians and their wives were in attendance. Dr. A. E. Sohmer of Mankato was the principal speaker.

JANUARY, 1943

HAVE YOU PATIENTS

With Any Of These Conditions?



Hernia?

Enteroptosis with Symptoms?

Sacroiliac Sprain or other Back Injury?

Spinal Arthritis or Sciatica?

Postoperative Conditions?

Maternity or Postpartum Conditions?

Breast Problems?

Spencer Abdominal Supporting Corset shown open revealing inner support. This is a SEPARATE section, adjustable to the corset section and the patient's figure by means of flat tapes that emerge on outside of corset.

When you prescribe a Spencer Support you are assured it will meet your specific requirements and the patient's figure needs, because it will be individually designed, cut and made for the one patient who is to wear it.

Every Spencer Support is individually designed for the patient of non-elastic material. Hence, the support it provides is constant, and a Spencer can be—and IS—guaranteed NEVER to lose its shape. Spencer Supports have never been made to stretch to fit; they have always been designed to fit. Why prescribe a support that soon loses its shape and becomes useless before worn out? Spencers are light, flexible, durable, easily laundered.

For service, look in telephone book under "Spencer Corsetiere" or write direct to us.

SPENCER INDIVIDUALLY DESIGNED
Abdominal, Back and Breast Supports

SPENCER INCORPORATED,
137 Derby Ave., New Haven, Conn.
In Canada: Rock Island, Quebec.
In England: Spencer (Banbury) Ltd., Banbury, Oxon.
Please send booklet, "How Spencer Supports Aid the Doctor's Treatment."

May We Send You Booklet?

..... M. D.
Address

What Is Your Profession?

MEDICINE

12 hour day
Hospital Bed Shortage
Nurse Shortage
Draftee Examinations
Military Service

BUSINESS

Uncollectible Accounts
Taxes
War Bonds
Office Expenses
Property Problems



The problems of the man of medicine are many. During this trying period you won't have the time for personal attention to your collection problems. Let us carry this burden for you. Instead of adding to your expense, you'll be money ahead in the long run because we'll collect more money by having your accounts now while more of them are still collectible. If you are soon to enter military service, ask us about our very attractive "military service plan."



Congratulations to Minnesota Medicine on its 25th Anniversary

MINNEAPOLIS CLINICAL ASSOCIATION

Established 1922

The Exclusive Collection Service in the Medical Arts Building

204-207 Medical Arts Building — BRidgeport 1151-2-3-4

Member: National Association of Medical-Dental Bureaus, an organization composed exclusively of the accredited medical-dental collection associations throughout the United States.

WASHINGTON COUNTY MEDICAL SOCIETY

Officers for 1943 were elected at the annual meeting of the Washington County Medical Society, held December 8, 1942, in the old Stillwater Clubrooms. The new officers include the following: President, Ray George Johnson, Minnesota State Prison; first vice president, Carnot H. Sherman, Stillwater; second vice president, George McCue Ruggles, Forest Lake; secretary-treasurer, E. Sydney Boleyn, Stillwater; delegate, E. Sydney Boleyn, Stillwater; alternate, Wade R. Humphrey, Stillwater; censors, J. W. Stuhr, Stillwater, E. V. Strand, Bayport, and R. J. Jósewski, Stillwater.

WOMAN'S AUXILIARY

Mrs. RAYMOND J. JOSEWSKI, President

Stillwater, Minnesota

Mrs. W. H. RUCKER, Publicity Chairman
Minneapolis, Minnesota

East Central

The East Central Auxiliary met at Cambridge December 1. Members and their husbands were dinner guests at the State Epileptic Colony. Following the dinner the ladies retired to the apartment of Mrs. D. E. McBroom where the business meeting was conducted by the president, Mrs. A. B. Roehlke. Twelve members were present.

The Auxiliary decided to keep up the state member-

ship dues of the members of the district whose husbands are in the service.

Goodhue County

The highlights of the October meeting of the Goodhue County Medical Auxiliary included decisions to aid the Christmas Seal Sale, support the Women's Cancer Control Association, pay dues of all members whose husbands were in service and send a round-robin letter to them. Hostess for the meeting was Mrs. V. Nordholm of Ellsworth.

Hennepin County

Thirty-two members of the Hennepin County Auxiliary folded literature and placed Christmas Tuberculosis Seals in 24,250 envelopes on November 9 at the tuberculosis county headquarters. Following came the annual sale at Dayton's of handiwork of the Glen Lake tuberculosis patients, continuing for three days. Great appreciation is due Dayton's for giving the space and use of charge accounts and to Mrs. J. A. Myers, who so ably managed the sale. A sum of \$1,537.75 was realized for articles sold, the entire amount going directly back to the patients.

On November 16 Mrs. James A. Johnson, president, gave a tea for wives of men in service of Base Hospital No. 26 and others. One hundred twenty-five invitations were sent, the executive board receiving guests with Mrs. Johnson.

WOMAN'S AUXILIARY

Sarahurst is a boarding home for discharged Glen Lake patients without homes of their own to return to. Each year in December a meeting in the form of a Silver Tea for the Home's benefit is given by the Hennepin County Auxiliary. This year the \$36.80 donated will be divided among the girls occupying the Auxiliary's room.

The program consisted of Christmas carols sung by the group under Mrs. Gilbert Seashore's direction and a very interesting discussion of China's educational system by Mrs. Walter Judd.

Mower County

Mrs. H. B. Allen was appointed Auxiliary Bond and Stamp Chairman of the Women's Division of the War Savings Staff at the meeting of the Auxiliary to the Mower County Medical Society in December at the home of Mrs. B. J. Cronwell, Austin.

This was the first Austin organization to give active support to the staff which plans to mobilize America's 43,000,000 women behind the war bond program. Members voted to study home nursing as a unit and the rest of the afternoon was devoted to reviewing the history of the Auxiliary.

The meeting was preceded by a dessert luncheon. The group will meet again on the fourth Monday in January at the home of Mrs. L. A. Flanagan, Austin.

Renville County

The Renville County Medical Auxiliary held its December meeting on Tuesday, the first, in the Olivia High School. The Home Economics class served a delicious dinner at 6:30 after which Dr. A. E. Sohmer of Mankato gave a short lecture on "Medical Ethics."

The women then adjourned to their meeting room for the annual Christmas Party. Mrs. J. A. Cosgriff of Olivia and Mrs. Ralph Erickson of Hector furnished the entertainment.

Rice County

Mrs. Adolph Hanson, president of Rice County Auxiliary, reports their group has organized a Surgical Dressing Unit for the Red Cross in Faribault and is conducting it with the help of outside groups. Individual members of the Auxiliary have had charge of nutrition and home nursing classes. All social activities for the year have been suspended due to the extra effort being made by all members to coöperate in every way with the war effort.

St. Louis County

At the annual rummage sale of the St. Louis County Auxiliary held November 17 in Duluth, \$171.60 was realized.

Mrs. M. A. Nicholson was hostess for the November card party and guests were the wives of interns of St. Luke's and St. Mary's Hospitals.

INSURANCE ESPECIALLY DESIGNED FOR PHYSICIANS

Protection designed for physicians. Health and accident policies without frills, giving substantial protection cost only \$2.00 per policy paid up in full to the middle of June, 1943.

Thirty-seven years of successful service has earned highest rating in the Insurance Digest for financial stability and loss paying record.

Write for Application

Minnesota Commercial Men's Assn.

Paul Clement, Secretary

2550 PILLSBURY AVENUE

MINNEAPOLIS, MINNESOTA

Announcing . . .

ELECTRONIC MODEL RADIOEAR released from the laboratories of one of America's oldest hearing aid manufacturers and pioneers in vacuum tube hearing aids.



The modern vacuum tube Radioear is small, neat, convenient. No disturbing distortion or noise. Includes the newest scientific developments in hearing aid design and offers you true, balanced tone quality—INDIVIDUALLY fitted. FREE TESTS. This is completely serviced at all times in our Minneapolis office.

**MADE FOR USE WITH AIR OR BONE CONDUCTION
BOTH IN CRYSTAL AND MAGNETIC TYPE**

**YOUR PATIENTS WILL RECEIVE OUR PERSONAL SERVICE
We employ no agents or salesmen**

"A DAWN OF A NEW DAY" BOOKLET IS YOURS FOR THE ASKING

Northwest Authorized Distributor



ROY E. SWANSTROM HEARING AID COMPANY
200-202 Medical Arts Building
Batteries and Service for All Types of Hearing Aids

Minneapolis—Br. 8988

Communication

Duluth, Minnesota,
December 2, 1942

To the Editor:

As a member of the Saint Louis County League for Planned Parenthood, I would like to answer the communication of Theodore H. Sweetser, M.D., in your September issue, in which he criticizes the exhibit of this organization at the meeting of the Minnesota State Medical Association in Duluth, June 29, 30 and July 1. In his letter to you, he quotes at length from an article in a magazine called *America*, condemning birth control and I assume the author's ideas are substantially his.

Had Dr. Sweetser more than "noticed" this exhibit last summer, had he talked to the registered nurse in charge in order to inform himself about the Planned Parenthood clinic, he might have learned why a large number of his colleagues endorse pregnancy-spacing services, medically prescribed under circumstances of blindness, insanity, transmissible disease, subnormality and dire poverty, exhibited in the slums of New York and in the "migrant villages" now in California. He might also have learned that there is no question of "race suicide" involved, since women desiring sound contraceptive information must have at least one child, must be referred to the clinic by a doctor or by a social agency. In fact the reverse is the case, for

high annual abortion figures and traffic in injurious contraceptives are a menace to human health and life. The national organization, the Planned Parenthood Federation of America, has received from physicians 35,000 requests for copies of its manual "Techniques of Conception Control."

May we suggest that Dr. Sweetser and the author of the article read recent articles in *Look Magazine*, entitled "Parenthood, U.S.A." showing what a service of medically prescribed contraceptives has done in South Carolina (where it is part of the state health program) and in other parts of the country. The negro family units of eighteen and twenty blind, diseased, rickety children pictured (before birth control) hardly represent "the daring and adventurous spirit that has made America" which the author of the quoted article says is jeopardized by birth control.

Quoting further from the article Dr. Sweetser submits, "Far from being a progressive and triumphant" movement . . . birth control is a cringing thing . . ." may I point out that a movement started a comparatively short time ago by one courageous woman against a barrage of public opposition, which has grown into a large national organization with thirty-two state organizations and 806 clinics giving baby-spacing advice to parents, with a membership of leading doctors, clergymen, sociologists, educators and economists can be called just that—"progressive and triumphant!"

(MRS. WM. H.) GENEVIEVE J. PRYOR

NOTE: The above has been read and approved by Dr. Elizabeth C. Bagley and Dr. W. E. Hatch, both of Duluth.

♦ Of General Interest ♦

Dr. Harold Hullsiek and Florence Allen, both of Saint Paul, were married December 11, 1942.

* * *

Dr. W. O. B. Nelson of the Fergus Falls Clinic has been appointed city health officer, succeeding the late Dr. W. A. Lee.

* * *

Dr. W. W. Brown of Minneapolis has moved to Grove City, Minnesota, where he will practice medicine, occupying the office suite of Dr. Julius Y. Feinstein.

* * *

Dr. B. F. Osburn of International Falls has taken over the practice of Dr. Charles E. Stafford at Beau-dette, Minnesota, while Dr. Stafford is in Army service.

* * *

Dr. Carl J. Lund of the Estrem Clinic, Fergus Falls, has been appointed county coroner to fill the unexpired term of the late Dr. W. A. Lee.

* * *

Dr. Charlotte J. Morrison of Minneapolis has been elected county physician of Hennepin County. She is the first woman to serve in this capacity in the county. A graduate of the University of Minnesota medical

school in 1934, Dr. Morrison specialized in diseases of children and later took postgraduate work in public health at Harvard University.

* * *

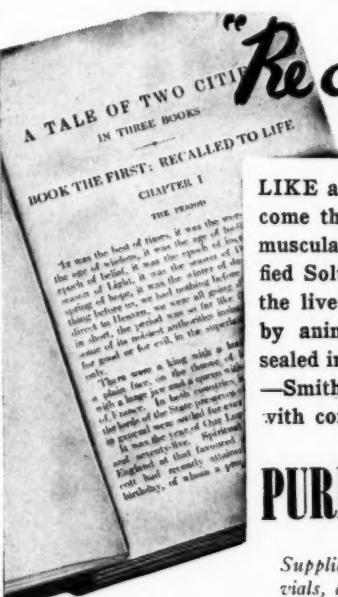
A mobile x-ray unit for use in anti-tuberculosis work in Saint Louis County will be purchased with the proceeds of the Christmas seal sale this year, through sponsorship of various service clubs, civic, business, farm and labor groups in the county. Part of the \$15,000 required to purchase the unit was raised last year.

* * *

Dr. V. M. Baich, formerly of Saint Paul, is now a member of the staff of the Itasca Clinic at Bovey, Minnesota, taking the place of Dr. J. C. Feuling, who recently went into service in the United States Navy. Mrs. Baich, a registered nurse formerly associated with the Earl Clinic in Saint Paul, will have charge of the technical and laboratory work at the Clinic.

* * *

Dr. Harlan Nelson, formerly of Brooten, Minnesota, but recently a resident of Los Angeles, was killed in an automobile accident near Braham, Minnesota, early



LIKE a call to renewed life for the pernicious anemia patient, come the latest developments in liver therapy. . . . For intra-muscular injection, Smith-Dorsey has prepared a U. S. P. Purified Solution of Liver containing all the fraction G (Cohn) of the liver extract. Rigidly standardized . . . twice tested by animal injection to prevent local tissue reaction . . . sealed in ampoules and vials . . . finally tested for sterility —Smith-Dorsey offers a product to which physicians can turn with confidence.

PURIFIED SOLUTION of LIVER

Supplied in 1 c.c. ampoules and 10 c.c. and 30 c.c. ampoule vials, each containing 10 U.S.P. Injectable Units per c.c.

The Smith-Dorsey Company

LINCOLN • NEBRASKA

Manufacturers of Pharmaceuticals to the Medical Profession since 1908



Western Electric HEARING AIDS

YOUR EARS
ARE OUR BUSINESS

DESIGNED

by Bell Telephone
Laboratories—pioneer
and world
leader in speech
and hearing re-
search.



FREE

Demonstration and
audiometric hear-
ing test. Individ-
ually fitted. Bone
or air conduction.

330
THIRD FLOOR
MEDICAL ARTS
BLDG.

WESTERN ELECTRIC HEARING AIDS GIVE
YOUR PATIENTS THE NEXT THING TO
NORMAL HEARING

Visit or Call Us at Our
—New Location—

Phone
ATlantic
7593

AUDIPHONE CO.

330 Medical Arts Bldg., 825 Nicollet Ave., Minneapolis, Minn.

in December when his car hit a stretch of loose gravel. Dr. Nelson was only thirty-five years of age. He had spent five years on the resident staff of the General Hospital, Minneapolis, before going west. He had returned to Minneapolis recently to join the Navy as a surgeon.

* * *

Dr. Irvine McQuarrie, professor of pediatrics, University of Minnesota Medical School, delivered three addresses November 3 and 4, in the twelfth Porter Lectureship in Medicine at the University of Kansas School of Medicine. On November 3 he spoke at the Kansas City branch on "Experiments of Nature and the Advancement of Medical Knowledge." On November 4 he spoke at Lawrence on "Medical Experiences in Besieged China," and that night again at Kansas City on "Diseases of Adrenal Glands in Children."

* * *

A portable fracture bed to be housed at Marshall, Minnesota, for use of residents in Marshall, Minneota, Tracy, Milroy, Amiret, Balaton, Burchard, Tyler, Cottonwood, Florence, Garvin, Ghent, Green Valley, Lynd, Russell, Taunton, Granite Falls, Clarkfield, Echo, Wood Lake, Hanley Falls, Hazel Run and surrounding rural

areas will be purchased with funds raised in a special campaign sponsored by the American Legion Auxiliary in Marshall this year. Previous campaigns sponsored by this group have placed at the disposal of this area an infant incubator and an inhalator.

* * *

Col. James O. Gillespie of Denver, Colorado, a war prisoner in the Philippines, has been awarded the Distinguished Service Medal, the highest non-combat decoration of the Army, for developing hospitals on besieged Bataan with only extremely limited resources in personnel and equipment. A native of North Dakota, Colonel Gillespie graduated from the Medical School of the University of Minnesota, interned at Fitzsimmons Hospital, Denver, was transferred to Honolulu in 1930 and to Manila in 1940. Colonel Gillespie is a brother of Dr. M. G. Gillespie of Duluth. His wife and two sons are at present in Denver.

* * *

Minnesota physicians who appeared on the program of the annual meeting of the Radiological Society of North America, in Chicago, November 30 to December 4, 1942, included the following:

OF GENERAL INTEREST

C. Allen Good, Rochester: Intussuscepting Lesions of the Small Intestine.

John D. Camp, Rochester, in collaboration with Leo A. Nash, Fargo, North Dakota: Developmental Thinness of the Parietal Bones.

Leo G. Rigler, Minneapolis: Infected Cyst of the Lung.

Robert E. Fricke, Rochester, in collaboration with P. N. Pastore, Richmond, Virginia: Radium Treatment of Hypertrophied Lateral Bands of the Pharynx.

Eugene T. Leddy, Rochester: Roentgen Therapy for Bronchiogenic Carcinoma.

Wm. C. MacCarty, Rochester: Panel Discussion on Treatment of Carcinoma of the Larynx; Pathology.

* * *

A Gift to Meeker County Tuberculosis Program

A new precedent in donations to public health work was created last month when Mr. J. W. Bryant of 3011 N.E. Ulysses Avenue, Minneapolis, formally presented a gift of \$500 to the work of the Committee on Tuberculosis of the Minnesota State Medical Association.

The money is to be used specifically for the Meeker County tuberculosis control project of the committee and constitutes the first lay gift of this type on record anywhere for use in epidemiological work.

Behind the gift is an unusual story which was told to the committee by Mr. Bryant at the meeting. He was himself found to have an unsuspected active tuberculosis last January, he said, as a result of routine tuberculin tests and chest radiograms made of all employees of the Northern Pump Company of Minneapolis, of which he is an official. Treatment included a successful collapse of the affected lung and Mr. Bryant was back at work with a minimum loss of time. The method by which his condition was discovered and the speed and effectiveness of his treatment profoundly impressed him. His gratitude took the form of the gift to the Meeker County program because that program also aims to find unsuspected cases through routine use of the tuberculin test and x-ray on an area basis in the general population.

The gift was accepted by the committee with the approval of the Council and will be used, it was announced, in accordance with the wishes of the donor, to help finance the county-wide tuberculosis survey of Meeker County. The program of the committee is modelled in essentials upon the program of the veterinarians for the control of tuberculosis among cattle. The demonstration in Meeker County is coupled with an accreditation plan by which any county measuring up to standards set by the committee may be accredited by joint action of the Minnesota State Medical Association and the Minnesota Department of Health.

"I realize," Mr. Bryant told committee members, "that the problem of arresting tuberculosis in the individual is a minor one in comparison with the larger problem of controlling it in the general population. I have no words to express my admiration for you and the Meeker County doctors in your attempt to create a working model here for the control of tuberculosis."

Mr. Bryant was made an honorary member of the committee at this meeting.

water without minerals is like food without salt

TASTE

GLENWOOD INGLEWOOD NATURAL SPRING WATER for home and office

GE NEVA 4351

Naturally Mineralized, Naturally Healthful

For Better Service Recommend The Apothecary Shop

"Saint Paul's Prescription Store"

- Biologicals
- Prescriptions
- Pharmaceuticals
- Dressings
- Physicians' Supplies

THE APOTHECARY SHOP

Frank W. Moudry, Prop.

5th & St. Peter

Saint Paul

Cedar 0571

OF GENERAL INTEREST



**Home
of
the
Auditorium
and
Library
of the
Ramsey
County
Medical
Society**

Lowry Medical Arts Buildings

4th Street Section

Saint Paul

Minnesota

Disabilities occasioned by war are covered in full.
86c out of each \$1.00 gross income
used for members benefit

**PHYSICIANS CASUALTY ASSOCIATION
PHYSICIANS HEALTH ASSOCIATION**



Hospital, Accident, Sickness
INSURANCE



For ethical practitioners exclusively
(57,000 Policies in Force)

LIBERAL HOSPITAL EXPENSE COVERAGE	For \$10.00 per year
\$5,000.00 ACCIDENTAL DEATH \$25.00 weekly indemnity, accident and sickness	For \$32.00 per year
\$10,000.00 ACCIDENTAL DEATH \$50.00 weekly indemnity, accident and sickness	For \$64.00 per year
\$15,000.00 ACCIDENTAL DEATH \$75.00 weekly indemnity, accident and sickness	For \$96.00 per year

40 years under the same management

\$ 2,220,000.00 INVESTED ASSETS

\$10,750,000.00 PAID FOR CLAIMS

\$200,000 deposited with State of Nebraska for protection
of our members.

Disability need not be incurred in line of duty—benefits
from the beginning day of disability.

Send for applications, Doctor, to

400 First National Bank Building Omaha, Nebraska

Physicians in Service

Dr. Stuart Lane Arey of Excelsior, Minnesota, reported for duty at Quantico, Virginia, in December as a lieutenant in the United States Navy.

Dr. Philip Rains Beckjord of Willmar, now serving with the United States Army, has been promoted to the rank of Major in the Medical Corps. He is at present holding the position of Executive Officer in a Medical Battalion at Camp Van Dorn, Mississippi.

Dr. N. O. Monserud, a member of the Raiter Hospital staff at Cloquet, Minnesota, is in training at San Antonio, Texas, having received his commission as first lieutenant in the United States Army in November.

Dr. George Olds of Waseca, a captain in the Air Corps, is stationed at George Wright Field, Spokane, Washington. Dr. Olds has been assigned to an engineers battalion and is preparing for foreign service.

Commander Irwin Norman, University of Minnesota graduate in the class of 1928, has joined the staff of General Douglas MacArthur's command as fleet surgeon of the Southwest Pacific fleet. In that position he will be in charge of all medical activities in the area for the United States Navy. In taking his new post in the Southwest Pacific Commander Norman will complete service which will have taken him almost around the world. It will be recalled that he was a member of the Harriman-Beaverbrook mission to Moscow and Kuibyshev, Russia, last year. Commander Norman visited his parents, Mr. and Mrs. August Norman, at Willmar, en route to his new post.



REMEMBER—

our complete line of trusses,
supporters, and elastic wear
when you next prescribe these
appliances. We are also
equipped to provide orthopedic
braces.

A registered nurse
and an experienced
fitter supervise the
department.

BROWN & DAY, INC.

St. Paul, Minnesota

OF GENERAL INTEREST

Dr. E. K. Ingebritson of Moorhead, Minnesota, has received his commission as captain in the medical corps and has reported for duty in the United States Army Air Base at Santa Ana, California.

Members of the Mayo Foundation now on extended active service include the following: J. W. Babb, Royal Canadian Air Force; R. W. Bratt, Lieutenant, M.C., American Air Force, United States Army; C. R. Johnson, Lieutenant, M.C., United States Army; W. W. Lindahl, Lieutenant, M.C., United States Army; C. P. Marvin, Lieutenant (jg), M.C., United States Naval Reserve; J. T. Nix, Lieutenant, M.C., United States Army; D. L. Paulson, Captain, M.C., United States Army; T. T. Perry, Lieutenant, M.C., United States Army; E. T. Rulison, Lieutenant, M.C., United States Army; J. T. Shelden, Captain, M.C., United States Army; H. J. Svien, Lieutenant (jg), M.C., United States Naval Reserve; F. R. Whitehouse, Lieutenant, M.C., United States Army; C. L. Yeager, Captain, M.C., United States Army.

Members of the Mayo Clinic Staff now on extended active service are: P. W. Brown, Major, M.C., United States Army; G. J. Thompson, Lieutenant Commander, M.C., United States Naval Reserve.

* * *

Hospital News

Miss Edna Wolfe of St. Peter has been named superintendent of the St. Peter Community Hospital, succeeding Miss Eda Roberts, who is now in Brookings, South Dakota. Miss Wolfe will be assisted in conducting the hospital by Mrs. William Francis who will

Effective, Convenient and Economical

THE effectiveness of Mercurochrome has been demonstrated by twenty years' extensive clinical use.

For the convenience of physicians Mercurochrome is supplied in four forms—Aqueous Solution for the treatment of wounds, Surgical Solution for preoperative skin disinfection, Tablets and Powder from which solutions of any desired concentration may readily be prepared.

Mercurochrome

(H. W. & D. Brand of dibrom-oxymercuri-fluorescein-sodium) is economical because solutions may be dispensed at low cost. Stock solutions keep indefinitely.



Mercurochrome is accepted by the Council on Pharmacy and Chemistry of the American Medical Association.

Literature furnished on request

HYNSON, WESTCOTT & DUNNING, INC.
BALTIMORE, MARYLAND

Cook County Graduate School of Medicine

(In Affiliation with Cook County Hospital)

Incorporated not for profit

ANNOUNCES CONTINUOUS COURSES

SURGERY—Two Weeks' Intensive Course in Surgical Technique starting January 11 and 25, February 8 and 22, and every two weeks throughout the year.

MEDICINE—One-Month Course in Electrocardiography and Heart Disease starting the first of every month, except August.

FRACTURES AND TRAUMATIC SURGERY—Formal and Informal Courses.

GYNECOLOGY—Two Weeks' Intensive Course starting April 5; Clinical and Diagnostic Courses.

OBSTETRICS—Formal and Informal Courses.

OTOLARYNGOLOGY—Two Weeks' Intensive Course starting April 19. Clinical and Special Courses.

OPHTHALMOLOGY—Two Weeks' Intensive Course starting April 5.

ROENTGENOLOGY—Courses in X-ray Interpretation, Fluoroscopy, Deep X-ray Therapy every week.

UROLOGY—Two Weeks' Course and One-Month Course available every two weeks.

CYSTOSCOPY—Ten-Day Practical Course every two weeks.

General, Intensive and Special Courses in All Branches of Medicine, Surgery and the Specialties.

TEACHING FACULTY — ATTENDING STAFF OF COOK COUNTY HOSPITAL

Address: Registrar, 427 S. Honore St., Chicago, Ill.

PROFESSIONAL PROTECTION

SINCE 1899
SPECIALIZED
SERVICE

In addition to our Professional Liability Policy for private practice we issue a special

MILITARY POLICY
to the profession in the Armed Forces
at a
REDUCED PREMIUM

THE
MEDICAL PROTECTIVE COMPANY
OF
FORT WAYNE, INDIANA

OF GENERAL INTEREST

WAUKESHA SPRINGS SANITARIUM



BUILDING ABSOLUTELY FIREPROOF

FOR THE CARE AND TREATMENT OF

NERVOUS DISEASES

BYRON M. CAPLES, M. D., Medical Director
FLOYD W. APLIN, M. D.

WAUKESHA, WIS.



REST HOSPITAL

A quiet, ethical hospital with therapeutic facilities for the diagnosis, care and treatment of Nervous and Medical cases. Invites coöperation of all reputable physicians who may supervise the treatment of their patients.

PSYCHIATRISTS IN CHARGE
Dr. Hewitt B. Hannah
Dr. Joel C. Hultkrans

2527 2nd Ave. S., Minneapolis. Phone At. 7369

Complete Optical Service

LENS GRINDING
DISPENSING

CONTACT LENSES
EYE PHOTOGRAPHY

N. P. Benson Optical Co., Inc.

Established 1913

Main Office: Minneapolis, Minn.

— BRANCHES —

Aberdeen - Duluth - Eau Claire - Winona
Bismarck - La Crosse - Wausau - Stevens Point
Albert Lea - Rapid City

be in charge of the obstetrical ward, and by the regular staff of nurses and assistants. Miss Wolfe received her nurses' training at Hillcrest Hospital, Minneapolis, and was affiliated with the Minneapolis General Hospital and the Covell and Community Hospitals in St. Peter as a nurse before her appointment by the hospital board.

* * *

A general letter has been sent by the State Board of Control to superintendents of all state institutions asking that poisonous drugs and similar substances be confined strictly to drug storerooms and kept separate from any items of food. This is being done as a precaution in averting any such tragedy as occurred recently in a state hospital at Salem, Oregon, with the death of forty-seven inmates, whose food had been contaminated with roach powder.

The Elizabeth Kenny Institute, occupying the building at Eighteenth Street and Chicago Avenue, Minneapolis, was formally dedicated with appropriate ceremonies, Thursday, December 17. A dinner in Sister Kenny's honor was given after the ceremonies at the Nicollet Hotel.

* * *

At the annual meeting of the St. Cloud Hospital medical staff in December officers for the ensuing year were elected as follows: President, Dr. H. B. Clark; vice president, Dr. J. B. Gaida; secretary, Dr. P. L. Halenbeck. The chiefs of the departments will retain their offices for the coming year. The Executive Committee of the staff during the coming year will consist of the following members: Dr. H. B. Clark, chairman; Dr. J. B. Gaida, Dr. P. L. Halenbeck, Dr. J. B. Beuning, Dr. C. F. Brigham, and Dr. W. T. Wenner.

* * *

Dr. Bert W. Caldwell, executive secretary of the American Hospital Association for fifteen years and editor of *Hospitals* since its establishment seven years ago, has resigned and will devote his time to special projects and to his farm in Shirland, Illinois. His resignation was accepted by the Board of Trustees with an expression of a deep feeling of appreciation of Dr. Caldwell's many years of loyal and devoted service.

* * *

"Doctors at War," a radio drama presented by the A.M.A. and the National Broadcasting Company in co-operation with the United States Army and Navy, will be heard each Saturday at five o'clock P.M. over the NBC network. The program which began December 26, 1942, will continue through June, 1943.